brother

FACSIMILE EQUIPMENT
SERVICE MANUAL

MODEL: FAX100/570/615/625/635/675
FAX575M/715M/725M
FAX590DT/590MC/825MC/875MC

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Specifications are subject to change without notice.

PREFACE

This publication is a Service Manual covering the specifications, construction, theory of operation, and maintenance of the Brother facsimile equipment. It includes information required for field troubleshooting and repair—disassembly, reassembly, and adjustment—so that service personnel will be able to understand equipment function, to rapidly repair the equipment and order any necessary spare parts.

To perform appropriate maintenance so that the facsimile equipment is always in best condition for the customer, the service personnel must adequately understand and apply this manual.

This manual is made up of five chapters and appendices.

CHAPTER I.	**GENERAL DESCRIPTION**
CHAPTER II.	**INSTALLATION**
CHAPTER III.	**THEORY OF OPERATION**
CHAPTER IV.	**INDICATION AND INFORMATION PRINTOUT OF ERROR**
CHAPTER V.	**MAINTENANCE**
APPENDICES	**Circuit Diagrams**

This manual describes the model and its versions to be destined for major countries. The specifications and functions are subject to change depending upon each destination.

CHAPTER I.

GENERAL DESCRIPTION

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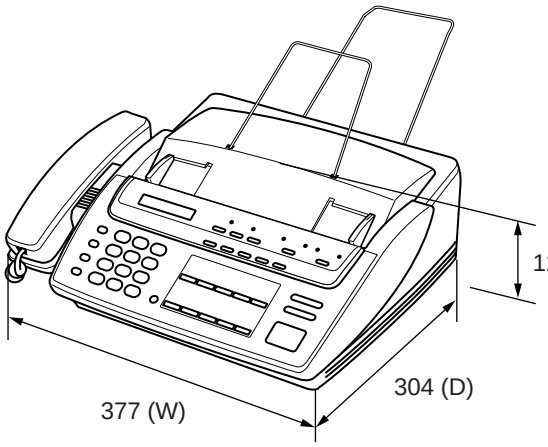
1. EQUIPMENT OUTLINE

1.1 External Appearance

The figure below shows the equipment appearance and approximate dimensions.



(Unit: mm)

1.2 Components

The equipment has the following components:

- Facsimile Equipment
  - Electronic/ Electrical/ Section
    - Main PCB
    - NCU PCB
    - Control Panel PCB
    - Recording Head Unit
    - LED Array (for illuminating documents)
    - Charge Coupled Device (CCD) Unit
    - Sensors
    - Power Supply PCB
  - Mechanical Section
    - Recorder & Cutter Unit
    - CCD Unit
    - Drive Motor (for paper & document feed and for cutter drive)
    - Clutch Solenoid
    - Drive Gears
    - Control Panel Unit
    - Covers
    - Automatic Document Feeder (ADF)
    - Handset
    - Frame and Miscellaneous Parts
  - Package
  - Accessories

2. SPECIFICATIONS

Model	FAX100	FAX615	FAX625	FAX635	FAX675
Color	1138	BN4	BN2	BN4	BN2
Modem Speed	9600 bps	9600 bps	9600 bps	9600 bps	9600 bps
Coding Method	MH	MH	MH	MH	MH
Transmission Speed	15 sec	15 sec	15 sec	15 sec	15 sec
CCITT Group	G3	G3	G3	G3	G3
Input/Output Width	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"
Auto Cutter	Yes	Yes	Yes	Yes	Yes
ADF Capacity (pages)	15	15	15	15	15
Anti-curl System	Yes	Yes	Yes	Yes	Yes
Paper Size (Standard thermal/Therma PLUS)	164'/164'	164'/164'	164'/164'	164'/164'	164'/164'
LCD Size	16 x 1	16 x 1	16 x 1	16 x 1	16 x 1
On-screen Programming	Yes	Yes	Yes	Yes	Yes
Super Fine	Yes	Yes	Yes	Yes	Yes
Smoothing	Yes	Yes	Yes	Yes	Yes
Gray Scale	32	32	32	64	64
One-touch Dialing	10x2	10	10x2	10x2	10x2
Speed Dialing	20	30	20	30	40
Group Dialing	No	No	No	No	No
Telephone Index	No	No	No	No	No
Speakerphone	Monitor	Monitor	Monitor	Monitor	Monitor
Fax/Tel Switch	Yes	Yes	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes	Yes	Yes
Enhanced Remote Activation	Yes	Yes	Yes	Yes	Yes
Distinctive Ringing	Yes	Yes	Yes	Yes	Yes
Next-Fax Reservation	Yes	No	Yes	Yes	Yes
Help	Yes	Yes	Yes	Yes	Yes
Caller ID	No	No	No	No	Yes
Automatic Redialing	Yes	Yes	Yes	Yes	Yes
Multi-Resolution Transmission	Yes	Yes	Yes	Yes	Yes
Polling	Std/Sec/Del	Std/Sec/Del	Std/Sec/Del	Std/Sec/Del	Std/Sec/Del
Delayed Transmission	Yes, 1 timer	Yes, 1 timer	Yes, 1 timer	Yes, 1 timer	Yes, 1 timer
Coverpage	Yes	Yes	Yes	Yes	Yes
Call Reservation	Yes	Yes	Yes	Yes	Yes
Call Back Message	Yes	Yes	Yes	Yes	Yes
Activity Report	Yes	Yes	Yes	Yes	Yes
Transmission Verification Report	Yes	Yes	Yes	Yes	Yes
Page Memory	No	No	No	No	No
ECM	No	No	No	No	No
Broadcasting	No	No	No	No	No
Quick Scanning	No	No	No	No	No
Out-of-Paper Reception	No	No	No	No	No
Multi Copy	No	No	No	No	No
Multi Transmission	No	No	No	No	No
TAD Type	No	No	No	No	No
ICM Recording Time	No	No	No	No	No
Remote Control	No	No	No	No	No
Paging	No	No	No	No	No
Toll Saver	No	No	No	No	No
Memo/2-Way Recording	No	No	No	No	No
Time/Date Stamp	No	No	No	No	No
Message Center	No	No	No	No	No
OGM	No	No	No	No	No
FAX Forwarding	No	No	No	No	No
FAX Retrieval	No	No	No	No	No
PCI (Missing link) (* : w/o PC FAX RX)	No	(Note 1)	(Note 1)	Option*	Option*
Password	No	No	No	No	No
Paper Save	No	No	No	No	No
Day-Night Mode	No	No	No	No	No
Elec. Vol. Control	No	No	No	No	No
FAX-on-demand	No	No	No	No	No
Voice-on-demand	No	No	No	No	No
Fax Mail Box	No	No	No	No	No
Voice Mail Box	No	No	No	No	No

(Note 1) No: Asia and Taiwan
Option*: Gulf, China, and Saudi Arabia

Model	FAX715M	FAX725M	FAX825MC	FAX875MC
Color	BN2	BN4	BN2	BN2
Modem Speed	9600 bps	14400 bps	14400 bps	14400 bps
Coding Method	MH	MH	MH	MH
Transmission Speed	15 sec	9 sec	9 sec	9 sec
CCITT Group	G3	G3	G3	G3
Input/Output Width	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"
Auto Cutter	Yes	Yes	Yes	Yes
ADF Capacity (pages)	15	15	15	15
Anti-curl System	Yes	Yes	Yes	Yes
Paper Size (Standard thermal/Therma PLUS)	164'/164'	164'/164'	164'/164'	164'/164'
LCD Size	16 x 1	16 x 1	16 x 1	16 x 1
On-screen Programming	Yes	Yes	Yes	Yes
Super Fine	Yes	Yes	Yes	Yes
Smoothing	Yes	Yes	Yes	Yes
Gray Scale	64	64	64	64
One-touch Dialing	10x2	10x2	10x2	10x2
Speed Dialing	40	40	40	80
Group Dialing	6	6	6	6
Telephone Index	Yes	Yes	Yes	Yes
Speakerphone	Monitor	Monitor	Monitor	Monitor
Fax/Tel Switch	Yes	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes	Yes
Enhanced Remote Activation	Yes	Yes	Yes	Yes
Distinctive Ringing	Yes	(Note 2)	Yes	(Note 3)
Next-Fax Reservation	Yes	Yes	Yes	Yes
Help	Yes	Yes	Yes	Yes
Caller ID	Yes	(Note 2)	Yes	(Note 3)
Automatic Redialing	Yes	Yes	Yes	Yes
Multi-Resolution Transmission	Yes	Yes	Yes	Yes
Polling	Std/Sec/Del	Std/Sec/Del	Std/Sec/Del/Seq	Std/Sec/Del/Seq
Delayed Transmission	Yes, 3 timers	Yes, 3 timers	Yes, 3 timers	Yes, 3 timers
Coverpage	Yes	Yes	Yes	Yes
Call Reservation	Yes	Yes	Yes	Yes
Call Back Message	Yes	Yes	Yes	Yes
Activity Report	Yes	Yes	Yes	Yes
Transmission Verification Report	Yes	Yes	Yes	Yes
Page Memory	10 pages	10 pages	50 pages	50 pages
ECM	Yes	Yes	Yes	Yes
Broadcasting	Yes	Yes	Yes	Yes
Quick Scanning	Yes	Yes	Yes	Yes
Out-of-Paper Reception	Yes	Yes	Yes	Yes
Multi Copy	Yes, w/sort	Yes, w/sort	Yes, w/sort	Yes, w/sort
Multi Transmission	Yes	Yes	Yes	Yes
TAD Type	No	No	IC Digital	IC Digital
ICM Recording Time	No	No	(18 min)	(18 min)
Remote Control	No	No	Full	Full
Paging	No	No	Yes	Yes
Toll Saver	No	No	Yes	Yes
Memo/2-Way Recording	No	No	Yes	Yes
Time/Date Stamp	No	No	Yes	Yes
Message Center	No	No	Yes	Yes
OGM	No	No	Yes	Yes
FAX Forwarding	No	No	Yes	Yes
FAX Retrieval	No	No	Yes	Yes
PCI (Missing link) (* : w/o PC FAX RX)	Option	Option	Option	Option
Password	No	No	No	No
Paper Save	No	No	No	No
Day-Night Mode	No	No	No	No
Elec. Vol. Control	No	No	No	No
FAX-on-demand			Yes	Yes
Voice-on-demand	No	No	Yes	Yes
Fax Mail Box	No	No	Yes, 5	Yes, 5
Voice Mail Box	No	No	Yes, 5	Yes, 5

(Note 2) No: Taiwan
Yes: Other countries

(Note 3) No: Asia, Gulf, China, and Saudi Arabia
Yes: Other countries

Model	FAX570	FAX575M	FAX590DT/590MC
Color	1138/1293 (Note 4)	1138/1293 (Note 4)	1138/1293 (Note 4)
Modem Speed	9600 bps	9600 bps	14400 bps
Coding Method	MH	MH	MH
Transmission Speed (Brother chart) (ITU-T No. 1 chart)	15 sec 19 sec	13 sec 15 sec	9 sec 10 sec
CCITT Group	G3	G3	G3
Input/Output Width	A4/A4	A4/A4	A4/A4
Auto Cutter	Yes	Yes	Yes
ADF Capacity (pages)	15	15	15
Anti-curl System	Yes	Yes	Yes
Paper Size (Standard thermal/Therma PLUS)	50 m/50 m	50 m/50 m	50 m/50 m
LCD Size	16 x 1	16 x 1	16 x 1
On-screen Programming	Yes	Yes	Yes
Super Fine	Yes	Yes	Yes
Smoothing	Yes	Yes	Yes
Gray Scale	32	64	64
One-touch Dialing	10x2	10x2	10x2
Speed Dialing	40	40	40
Group Dialing	None	6	6
Telephone Index	No	Yes	Yes
Speakerphone	No	No	No
Fax/Tel Switch	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes
Enhanced Remote Activation	Yes	Yes	Yes
Next-Fax Reservation	Yes	Yes	Yes
Help	Yes	Yes	Yes
Caller ID	UK/Holland/Sweden	UK	UK/Holland/Sweden
Automatic Redialing	Yes	Yes	Yes
Multi-Resolution Transmission	Yes	Yes	Yes
Polling	Std/Sec/Del	Std/Sec/Del	Std/Sec/Del/Seq
Delayed Transmission	Yes, 1 timer	Yes, 3 timers	Yes, 3 timers
Coverpage	Yes	Yes	Yes
Call Reservation	Yes	Yes	Yes
Call Back Message	Yes	Yes	Yes
Journal Report (Activity Report)	Yes	Yes	Yes
Transmission Verification Report	Yes	Yes	Yes
Page Memory (Brother chart) (CCITT No. 1 chart)	No No	10 pages 9 pages	55 pages 49 pages
ECM	No	Yes	Yes
Broadcasting	No	60	60
Quick Scanning	No	No	No
Out-of-Paper Reception	No	Yes	Yes
Multi Copy	No	Yes, w/stack & sort	Yes, w/stack & sort
Multi Transmission	No	Yes	Yes
TAD Type	No	No	IC Digital
ICM Recording Time	No	No	13 min
Remote Control	No	No	Yes
Paging	No	No	Yes
Toll Saver	No	No	Yes
Time/Date Stamp	No	No	Yes
Message Center	No	No	Yes
OGM	No	No	Yes
FAX Forwarding	No	No	Yes
FAX Retrieval	No	No	Yes
Connect 5000 Connectivity (PCI or Missing link) (* : w/o PC FAX RX)	No	Yes	Yes
Backup for Voice	No	No	6 hours
Backup for Page Memory	No	No	6 hours
Backup for Clock	15 hours	15 hours	15 hours
Password	No	No	No
FAX-on-demand	No	No	Up to 50 messages
Voice-on-demand	No	No	Up to 50 messages
Fax Mail Box	No	No	Yes, 5
Voice Mail Box	No	No	Yes, 5

(Note 4) 1293: German and UK versions
1138: Other versions

CHAPTER II.

INSTALLATION

CHAPTER III.

THEORY OF OPERATION

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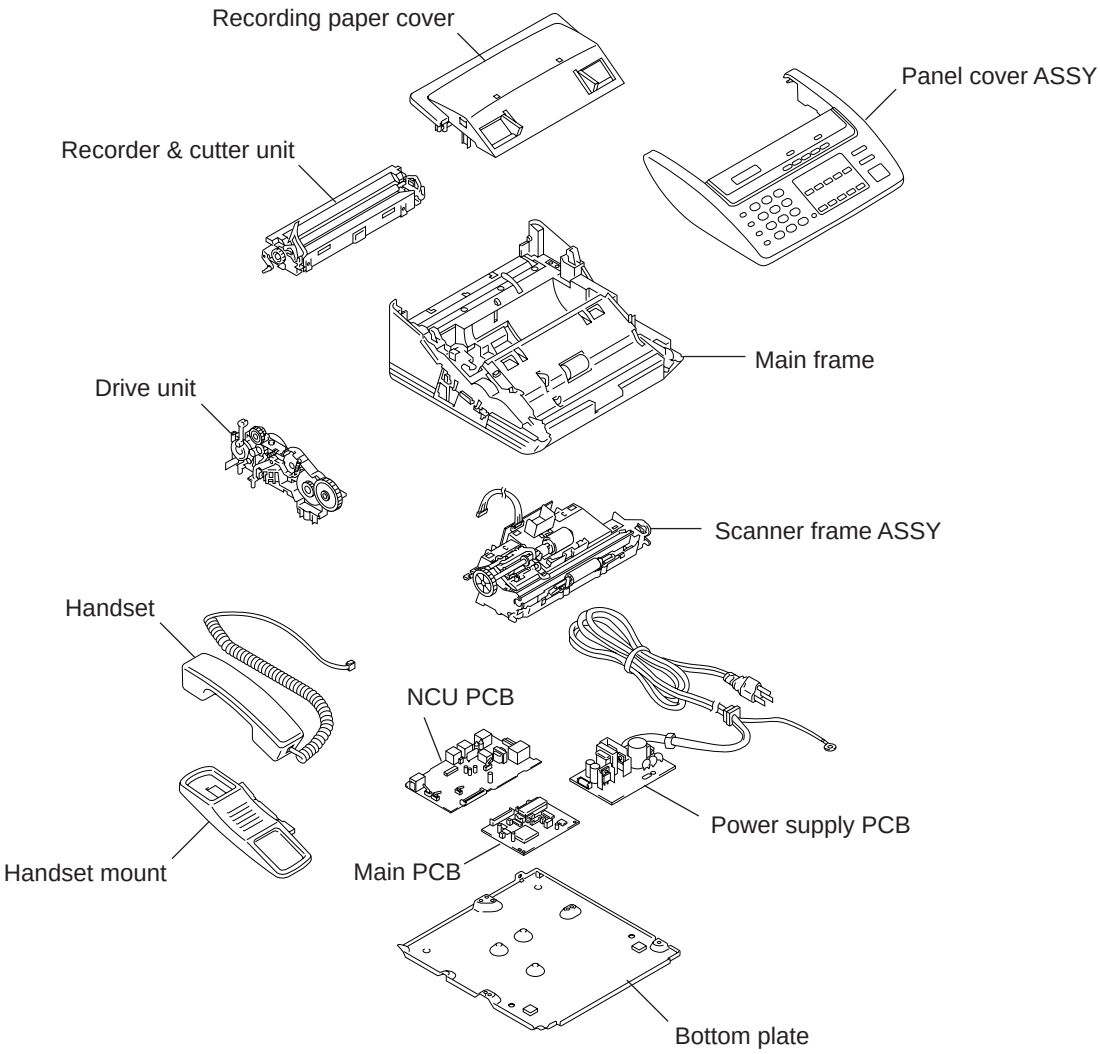
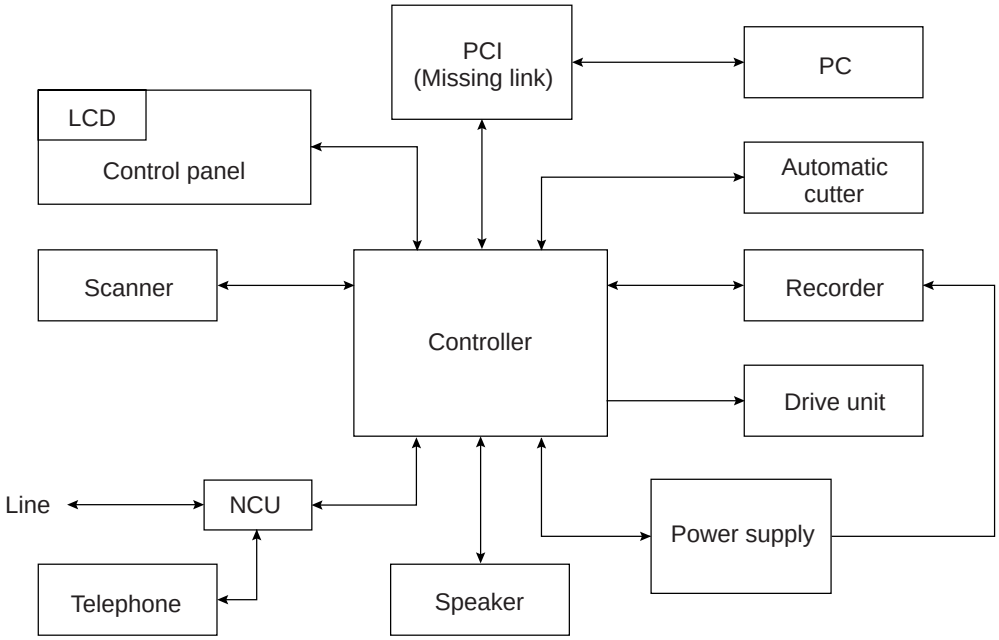
1. OVERVIEW

1.1 Mechanical Layout



1.2 Functional Block Diagram



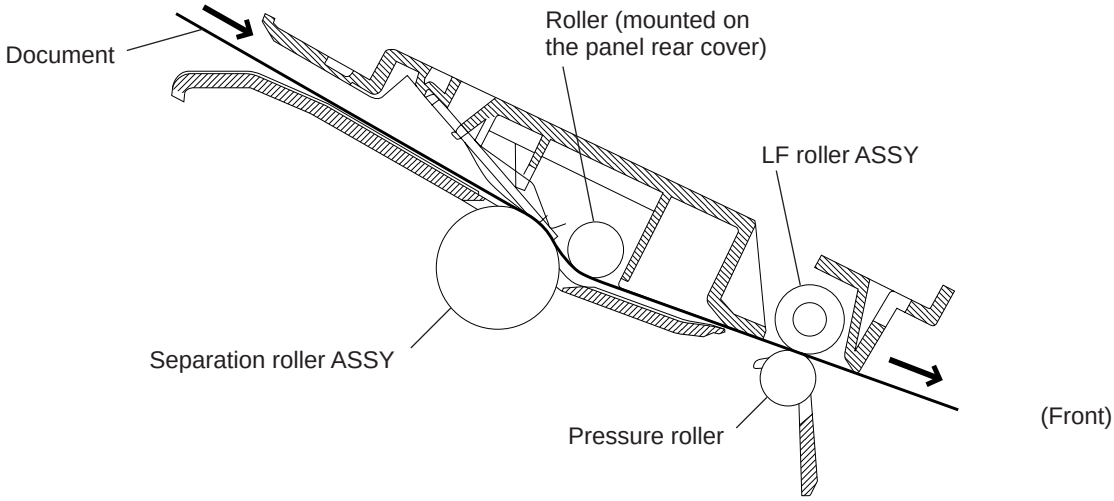
2. MECHANISMS

2.1 Transmitting Mechanism (Feeding and Scanning Documents)

The transmitting mechanism consists of the document stacker, automatic document feeder (ADF), document feeding related rollers, scanner, and document sensors. (For details about the sensors, refer to Section 2.3.)

If the operator sets documents on the stacker and starts the sending operation, the ADF feeds those documents into the equipment, page by page. Each document advances with the separation roller to the scanner, and then it is fed out of the equipment with the LF roller.

For the drive power source, refer to Section 2.4.



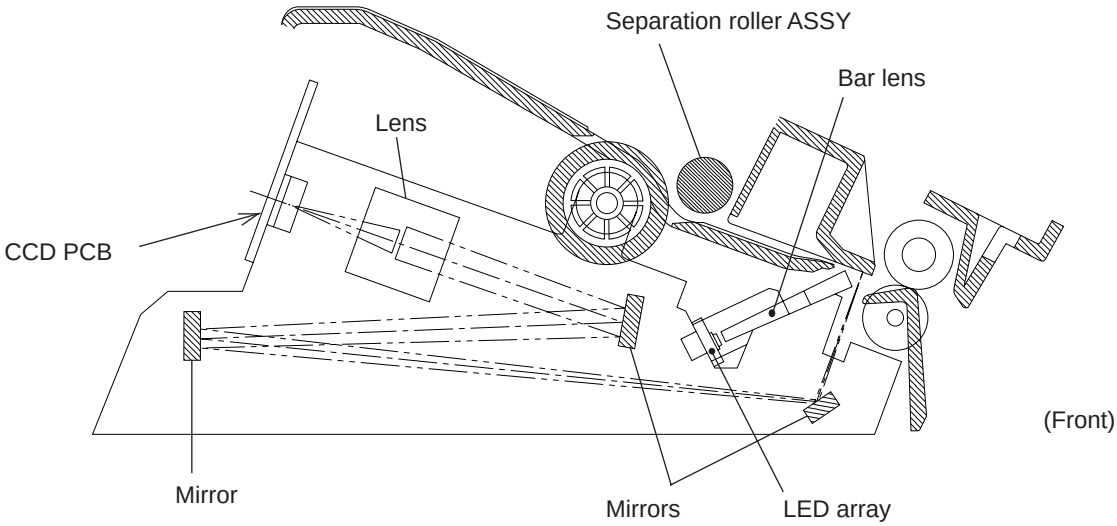
2.1.1 Automatic document feeder (ADF)

The ADF, which consists of the separation roller and separator, feeds documents set on the document stacker, starting from the bottom sheet to the top, page by page, due to the frictional difference among the separation roller, the documents, and the separator.

2.1.2 Scanner

The scanner uses a charge coupled device (CCD) image sensor.

As shown below, the LED array illuminates a document and the reflected light of the scanned image data is transmitted via the mirrors into the lens which reduces the scanned data so as to form the image on the CCD.

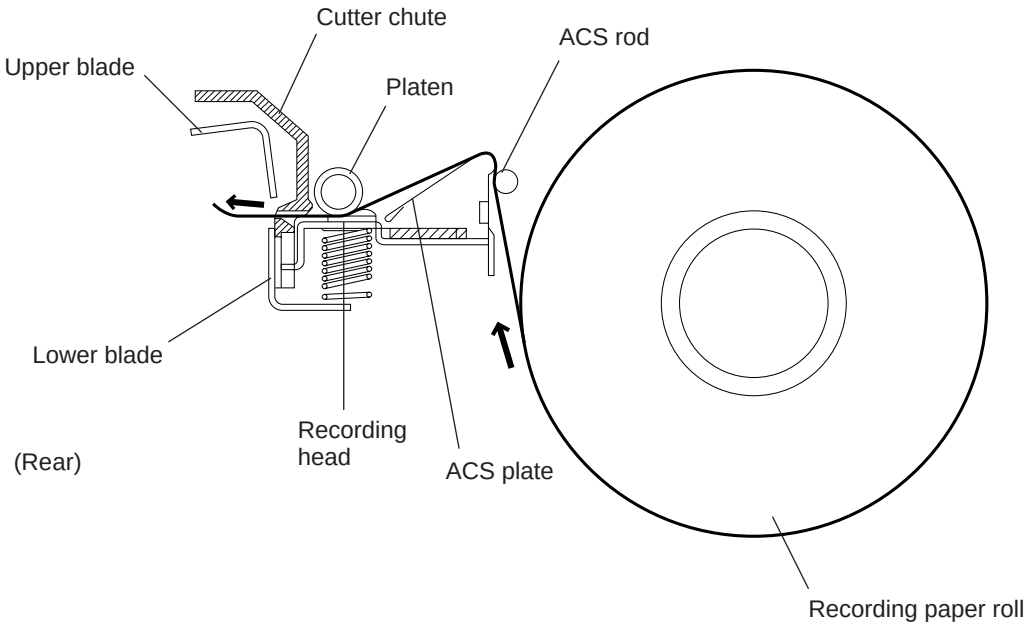


2.2 Receiving Mechanism (Feeding Recording Paper & Recording Data)

The receiving mechanism consists of the recording paper roll holder, anti-curl system (ACS), platen, thermal recording head, automatic cutter, and sensors. (For details about the sensors, refer to Section 2.3.)

The recording paper is routed through the ACS to the recording head which prints onto the heat-sensitive recording paper pressed by the platen according to received image signals. The printed paper is further fed through the cutter chute and cut by the automatic cutter page by page.

For the drive power source, refer to Section 2.4.



2.2.1 Anti-curl system (ACS)

The ACS eliminates curl peculiar to the rolled recording paper by curving the paper towards the opposite side of the curl with the ACS rod and the ACS plate.

2.2.2 Automatic cutter

The automatic paper cutter consists of an upper blade (rotary) and a lower blade (stationary). As the upper blade rotates around the left end as a support, the recording paper will be cut. Upon completion of cutting operation, the upper blade returns to the home position which is detected by the cutter sensor.

2.3 Sensors

This equipment has two photosensors and four mechanical sensors as described below.

Photosensors

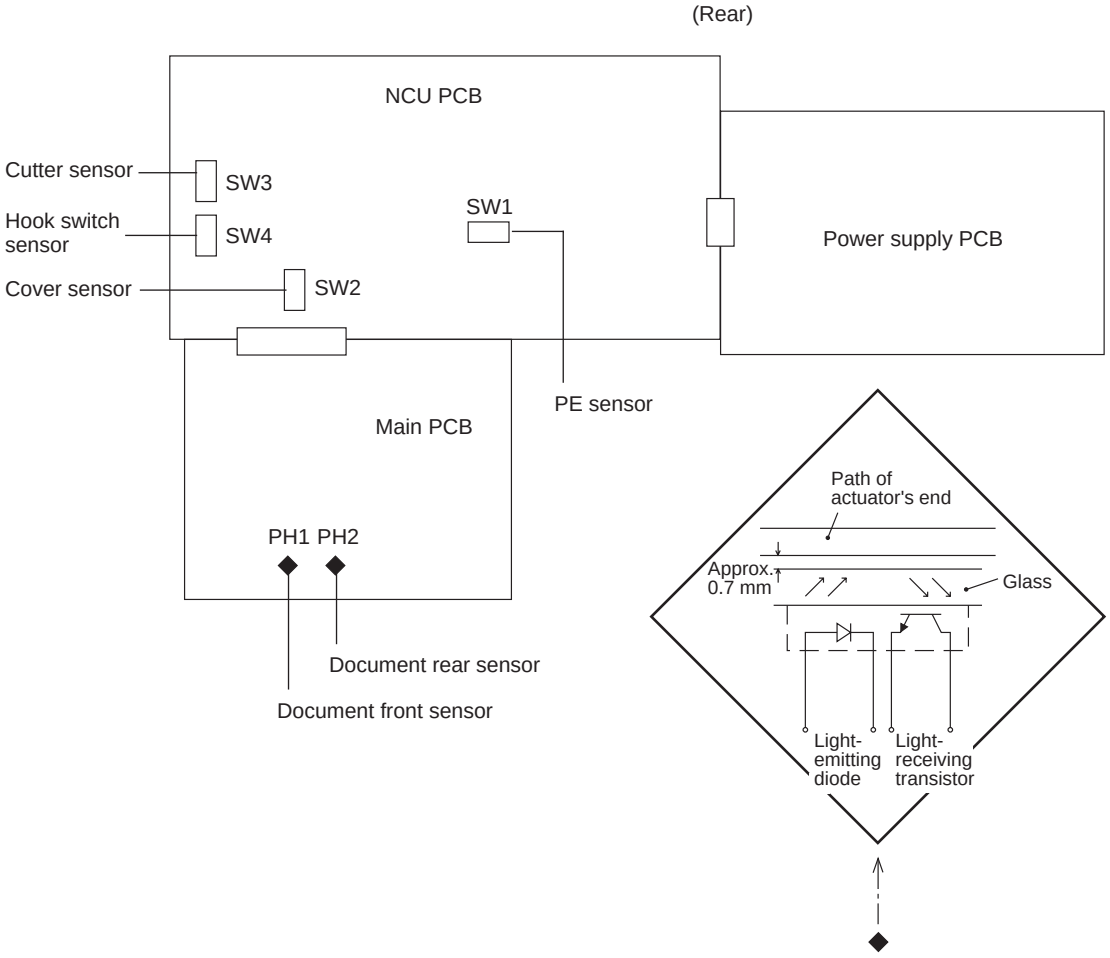
- Document front sensor which detects a presence of documents.
- Document rear sensor which detects the leading and trailing edges of pages to tell the control circuitry when the leading edge of a new page has reached the starting position and when the scan for that page is over.

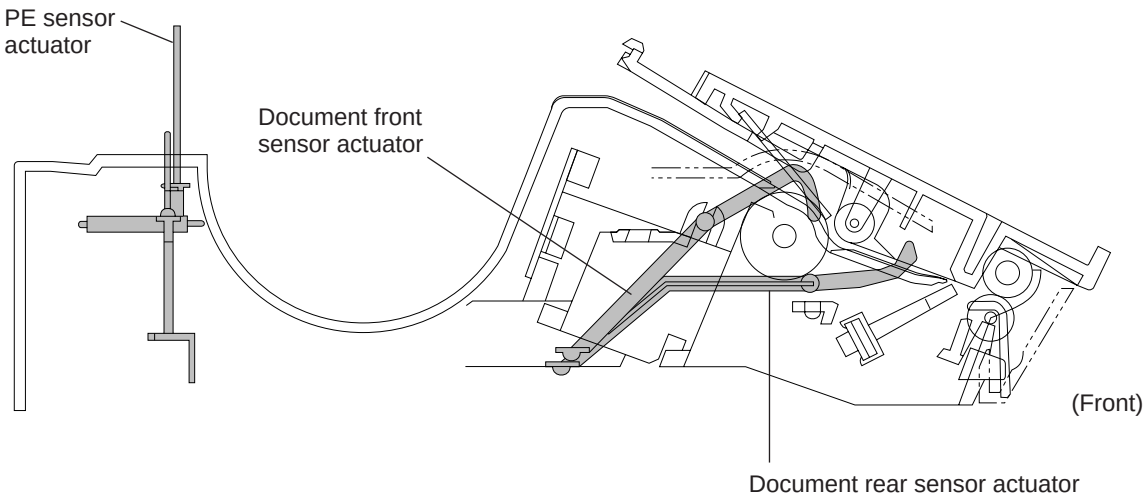
These two photosensors are located on the main PCB. They are of a reflection type consisting of a light-emitting diode and a light-receiving transistor. Each of them has an actuator separately arranged (see the next page). If an actuator is activated, its white end will come to the path of light issued from the light-emitting diode and reflect its light. The moment the reflected light enters the light-receiving transistor, the sensor signals the detection.

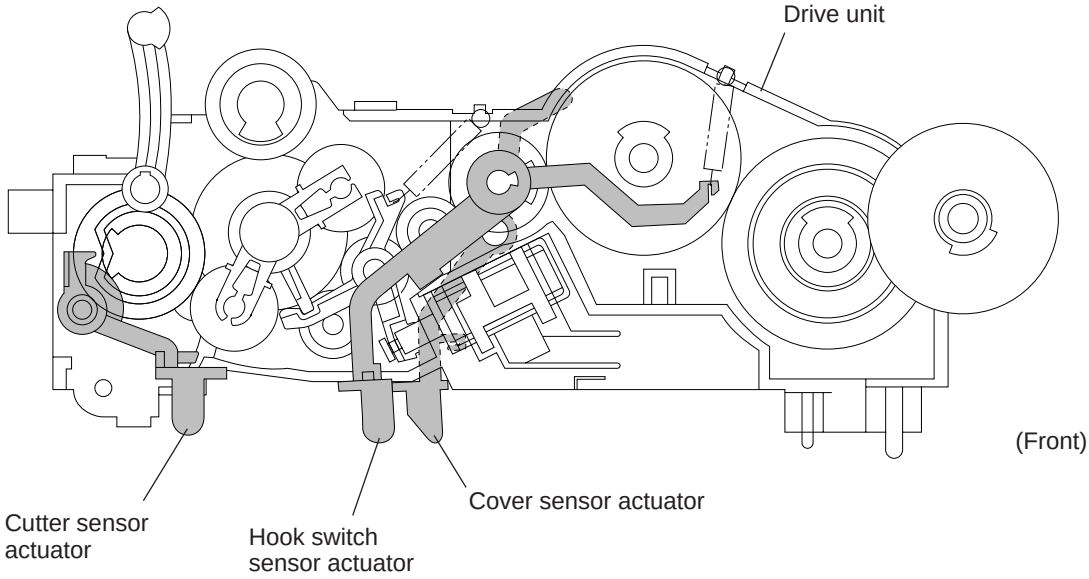
Mechanical sensors

- PE (paper empty) sensor which detects whether the recording paper is present.
- Cover sensor which detects whether the recording paper cover is closed.
- Cutter sensor which detects the home position of the upper rotary blade of the automatic cutter.
- Hook switch sensor which detects whether the handset is placed on the handset mount.

These four sensors are located on the NCU PCB. Each of them has an actuator separately arranged (see the next page). If an actuator is activated, its lower end pushes down the lever provided on the corresponding sensor so that the sensor signals the detection.







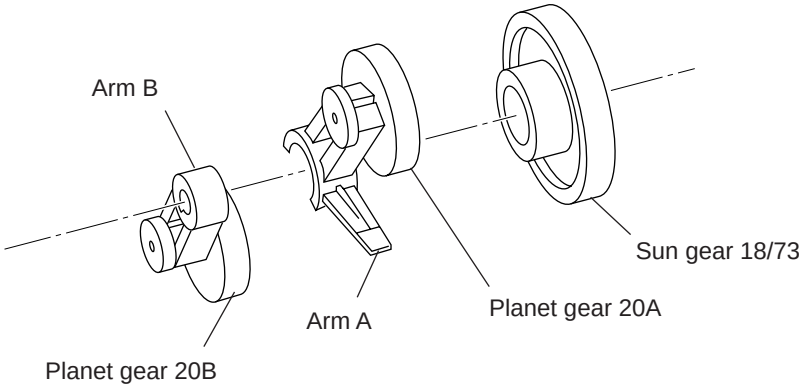
Location of Sensor Actuators

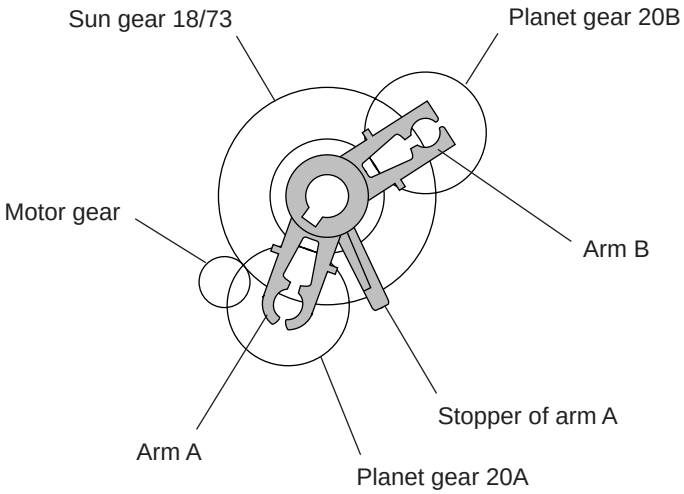
2.4 Power Transmission Shift by the Planetary Gear Train and Clutch Solenoid

The equipment has a single drive motor whose power transmission route can be switched by the planetary gear train and the clutch solenoid. Accordingly, the equipment mechanism can function in four operation modes (recording, scanning, copying, and cutter driving modes).

2.4.1 Description of planetary gear train

The planetary gear train consists of the sun gear 18/73, two planet gears 20, arm A, and arm B, as shown below.



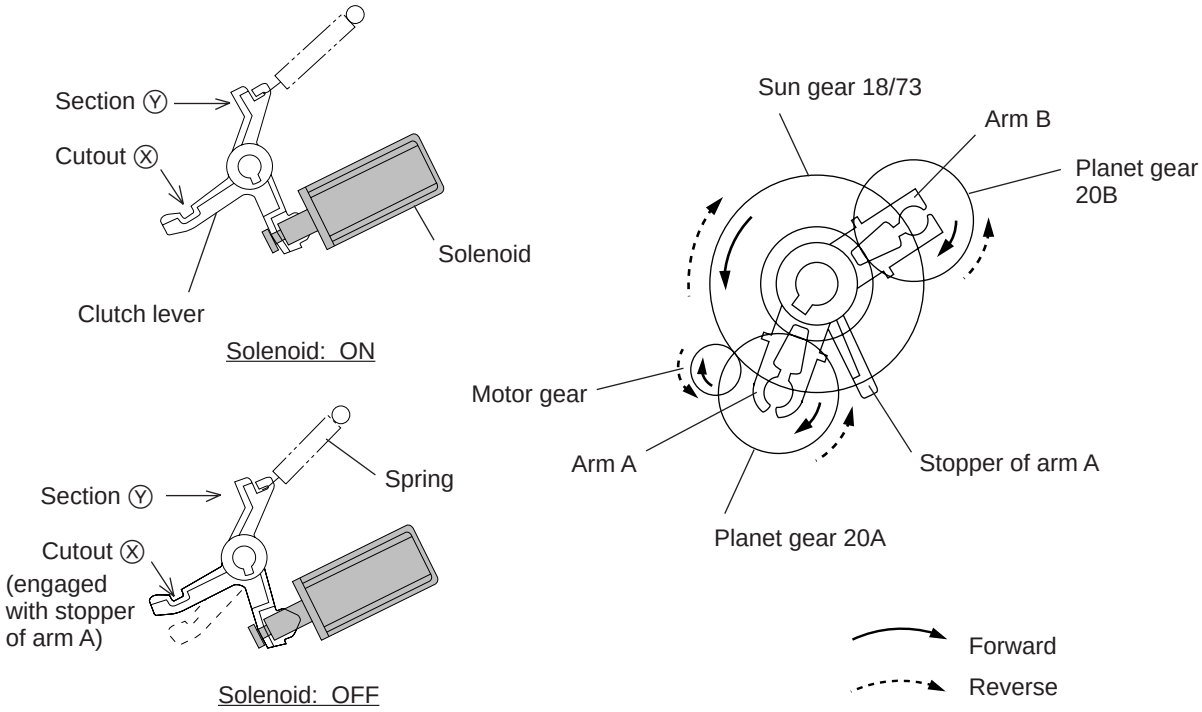


If the motor rotates, the sun gear 18/73 rotates so that the rotational force is transmitted to the engagement between the sun gear and the planet gears 20. Since the arms and planet gears are so designed that the moment of the arms is less than that of the planet gears, the arms turn around the center shaft in the same direction as the sun gear 18/73.

If the planet gear(s) becomes engaged with any other gear so that the arm cannot turn furthermore, the rotational force of the sun gear 18/73 is transmitted to that planet gear. Accordingly, the planet gear starts rotation in the opposite direction of the sun gear 18/73.

2.4.2 Power transmission for four operation modes

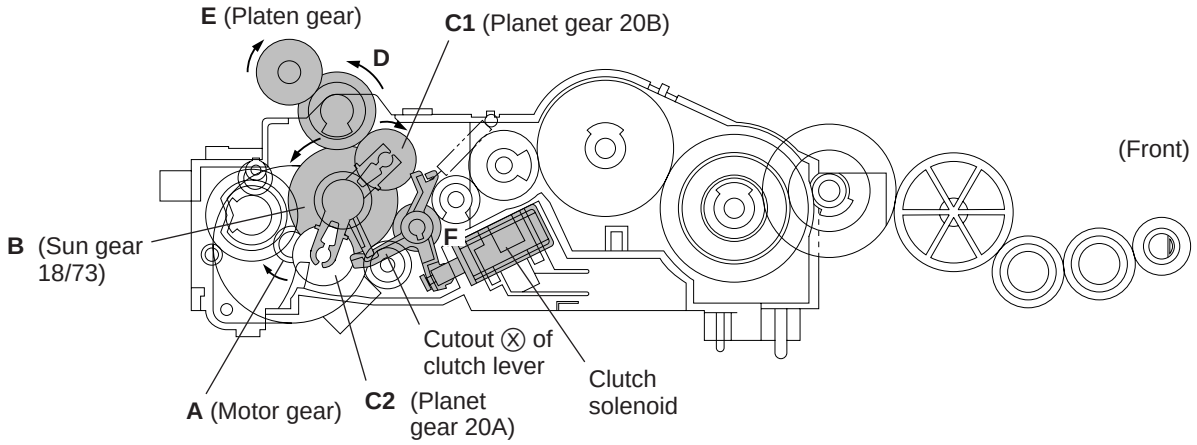
Depending upon the clutch solenoid ON/OFF state and the motor rotation direction, the planetary gear train switches the power transmission route for the four operation modes.



[1] Recording mode (Solenoid: OFF, Motor rotation: Forward)

In the recording mode, the control system deactivates the clutch solenoid (see the above figure, Solenoid: OFF). Therefore, when the motor rotates in the forward direction, the clutch lever turns clockwise with the spring and its cutout Ⓧ becomes engaged with the stopper of arm A. Once arm A is locked, the planet gear 20A (C2) will not be engaged with any other gear but simply idle.

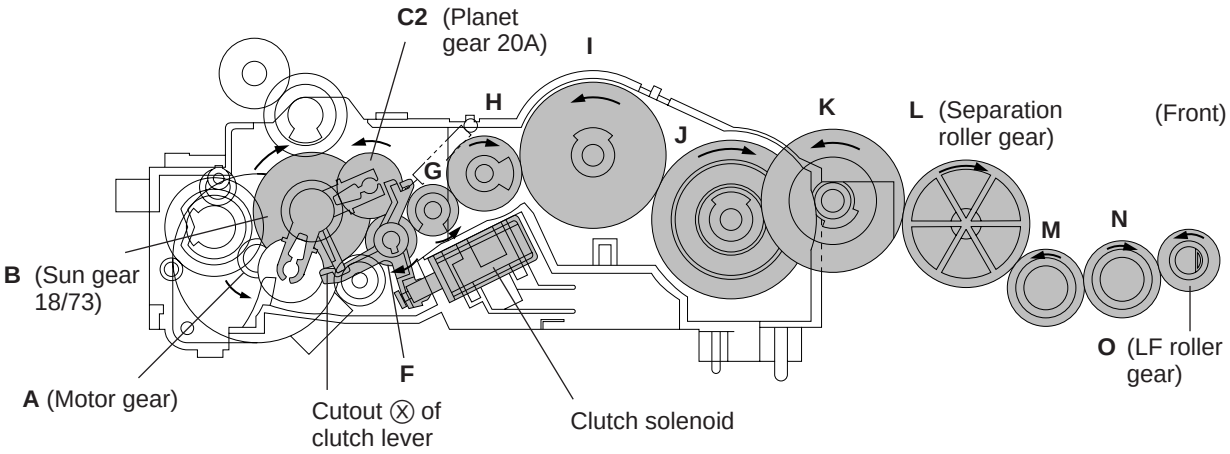
The motor rotation turns the sun gear 18/73 (B) counterclockwise so that the planet gear 20B (C1) transmits the rotation to the platen gear (E) via the gear D.



[2] Scanning mode (Solenoid: OFF, Motor rotation: Reverse)

Just as in the recording mode, the control system deactivates the clutch solenoid in the scanning mode to lock arm A.

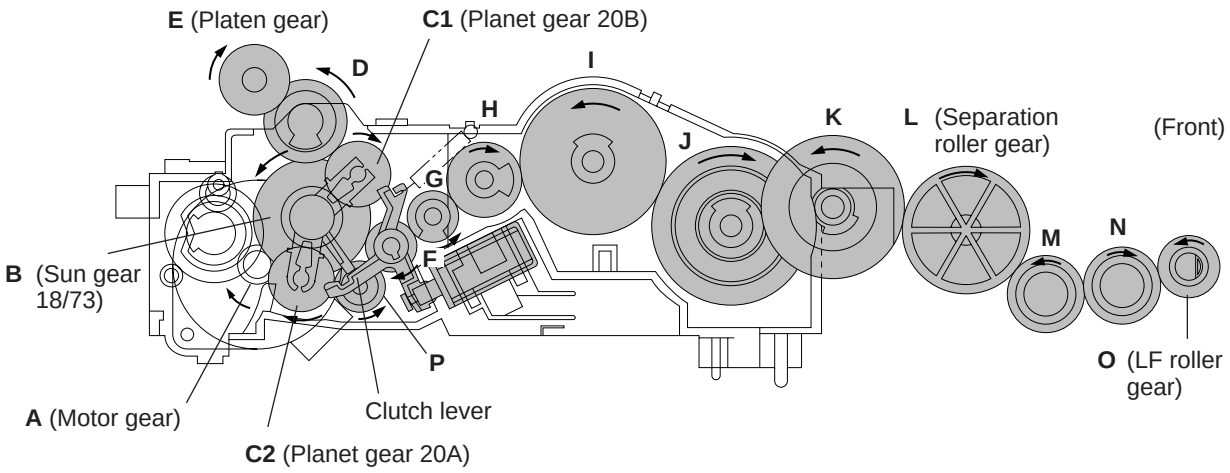
The motor rotates in the reverse direction and the sun gear 18/73 (B) rotates clockwise so that the planet gear 20A (C2) transmits the rotation to the separation roller gear (L) and LF roller gear (O) via the several gears.



[3] Copying mode (Solenoid: ON → OFF, Motor rotation: Forward)

The control system at first activates the clutch solenoid to release the stopper of arm A from coutout Ⓧ of the clutch lever while rotating the motor in the forward direction. Accordingly, the sun gear 18/73 (B) rotates counterclockwise so that both the planet gears 20B (C1) and 20A (C2) transmit the rotation to the platen gear (E) and the roller gears (separation roller gear and LF roller gear), respectively.

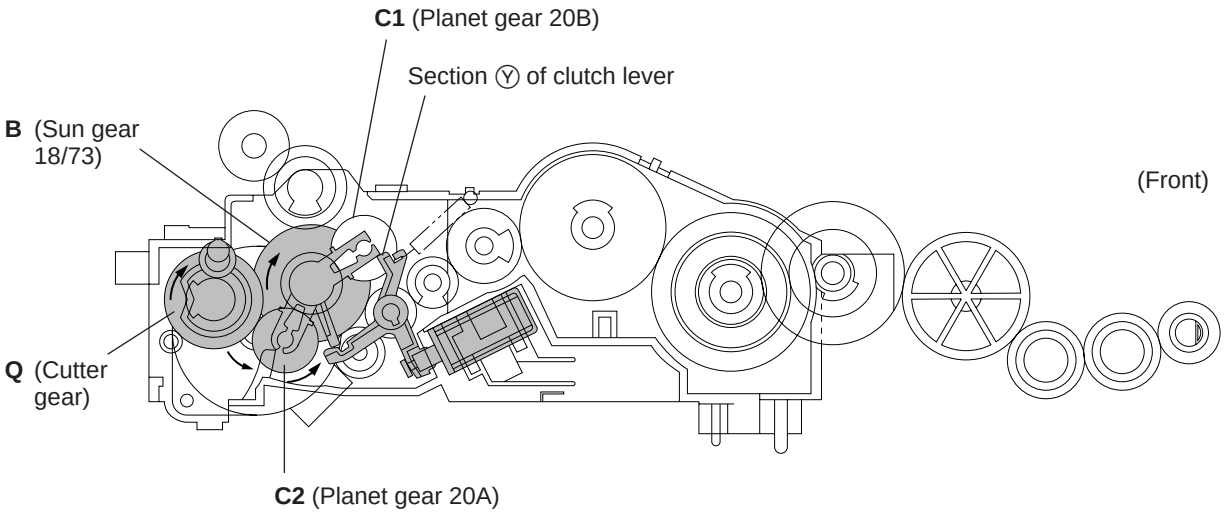
Once the planet gear 20A becomes engaged with the gear P, the control system deactivates the clutch solenoid.



[4] Cutter driving mode (Solenoid: ON, Motor rotation: Reverse)

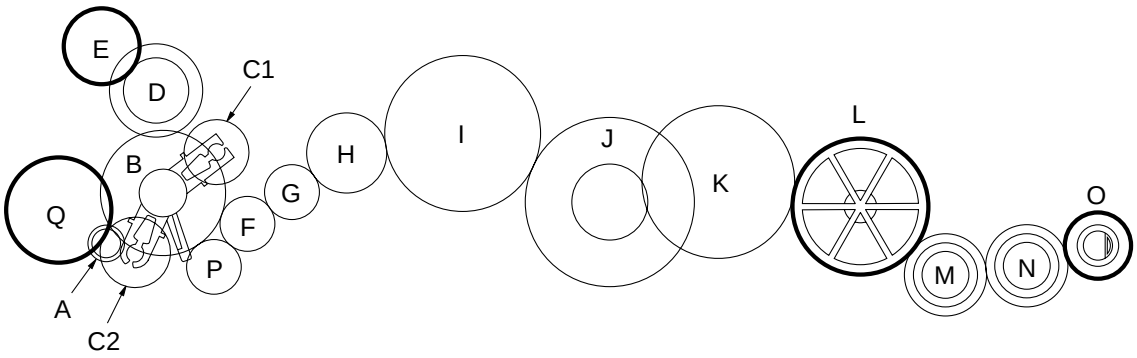
The control system activates the clutch solenoid to release the stopper of arm A from cutout Ⓧ of the clutch lever. When the motor rotates in the reverse direction, the sun gear 18/73 (B) rotates clockwise so that the planet gear 20A (C2) transmits the rotation to the cutter gear (Q).

Since the planet gear 20B (C1) is blocked by section Ⓨ of the clutch lever, it remains idling without engaging with any other gear.



2.4.3 Power transmission route

Rotation of the motor gear is transmitted as shown below.



A:	Motor gear	I:	Gear 44A
B:	Sun gear 18/73	J:	Gear 21/50
C1:	Planet gear 20B	K:	Gear 44B
C2:	Planet gear 20A	L:	Separation roller gear
D:	Gear 18/26	M:	Idle gear 24A
E:	Platen gear	N:	Idle gear 24B
F:	Gear 16A	O:	LF roller gear
G:	Gear 16B	P:	Gear 16C
H:	Gear 24	Q:	Cutter gear

[1] Recording Mode (Solenoid: OFF, Motor rotation: forward)

A → B → **C1 → D → E**
C2 (idling)

[2] Scanning Mode (Solenoid: OFF, Motor rotation: reverse)

A → B → **C1 (idling)**
C2 → F → G → H → I → J → K → L → M → N → O

[3] Copying Mode (Solenoid: ON → OFF, Motor rotation: forward)

A → B → **C1 → D → E**
C2 → P → F → G → H → I → J → K → L → M → N → O

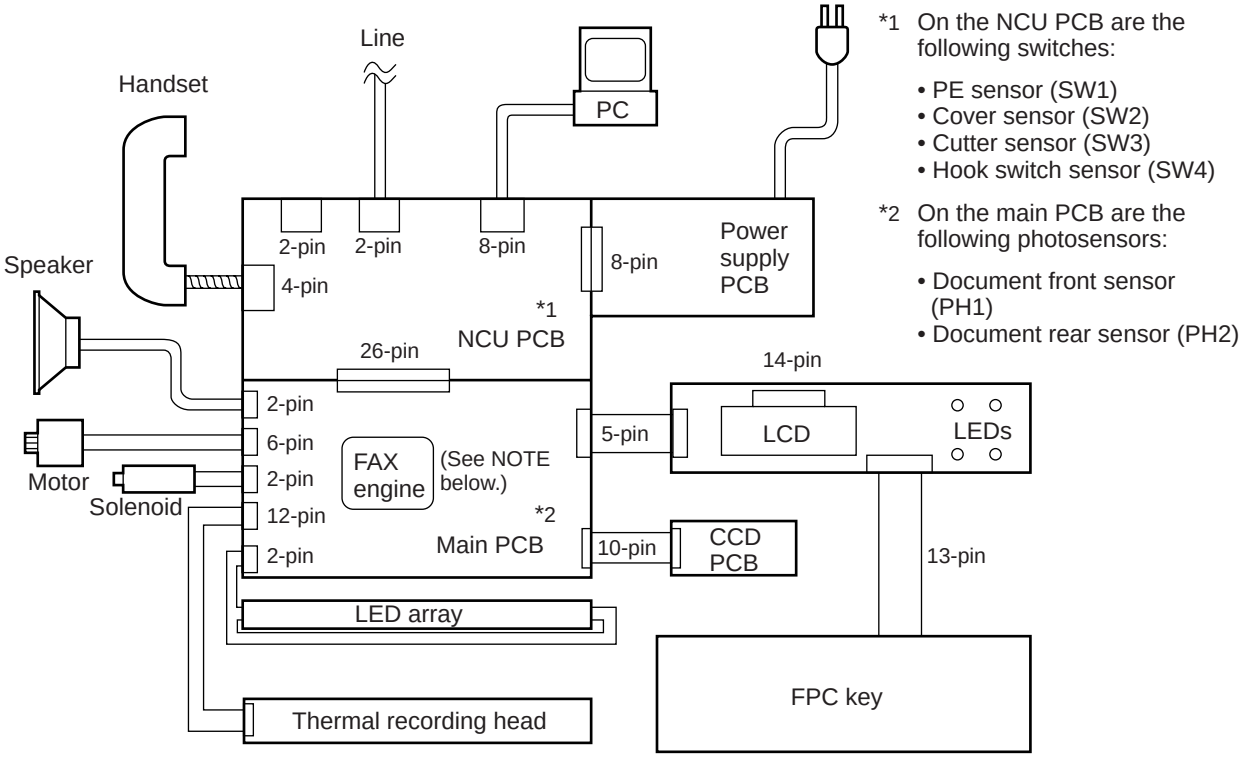
[4] Cutter Driving Mode (Solenoid: ON, Motor rotation: reverse)

A → B → **C1 (idling)**
C2 → Q

3. CONTROL ELECTRONICS

3.1 Configuration

The hardware configuration of the facsimile equipment is shown below.

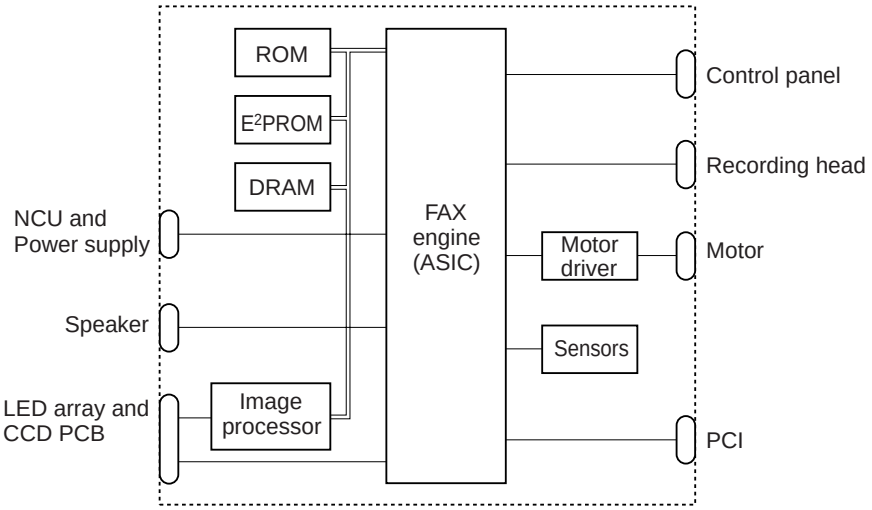


NOTE: The FAX engine includes a CPU and gate array. In the FAX100/570/615/625/635/675/575M/715M, it also includes a MODEM.

Configuration of Facsimile Equipment

3.2 Main PCB

The main PCB, which is the nucleus controlling the entire operation of the equipment, consists of a FAX engine (ASIC), memories, MODEM (except for FAX100/570/615/625/635/675/575M/715M), motor drive circuitry, sensor detection circuitry, and analog circuits for scanning, recording, and power transmission switching.

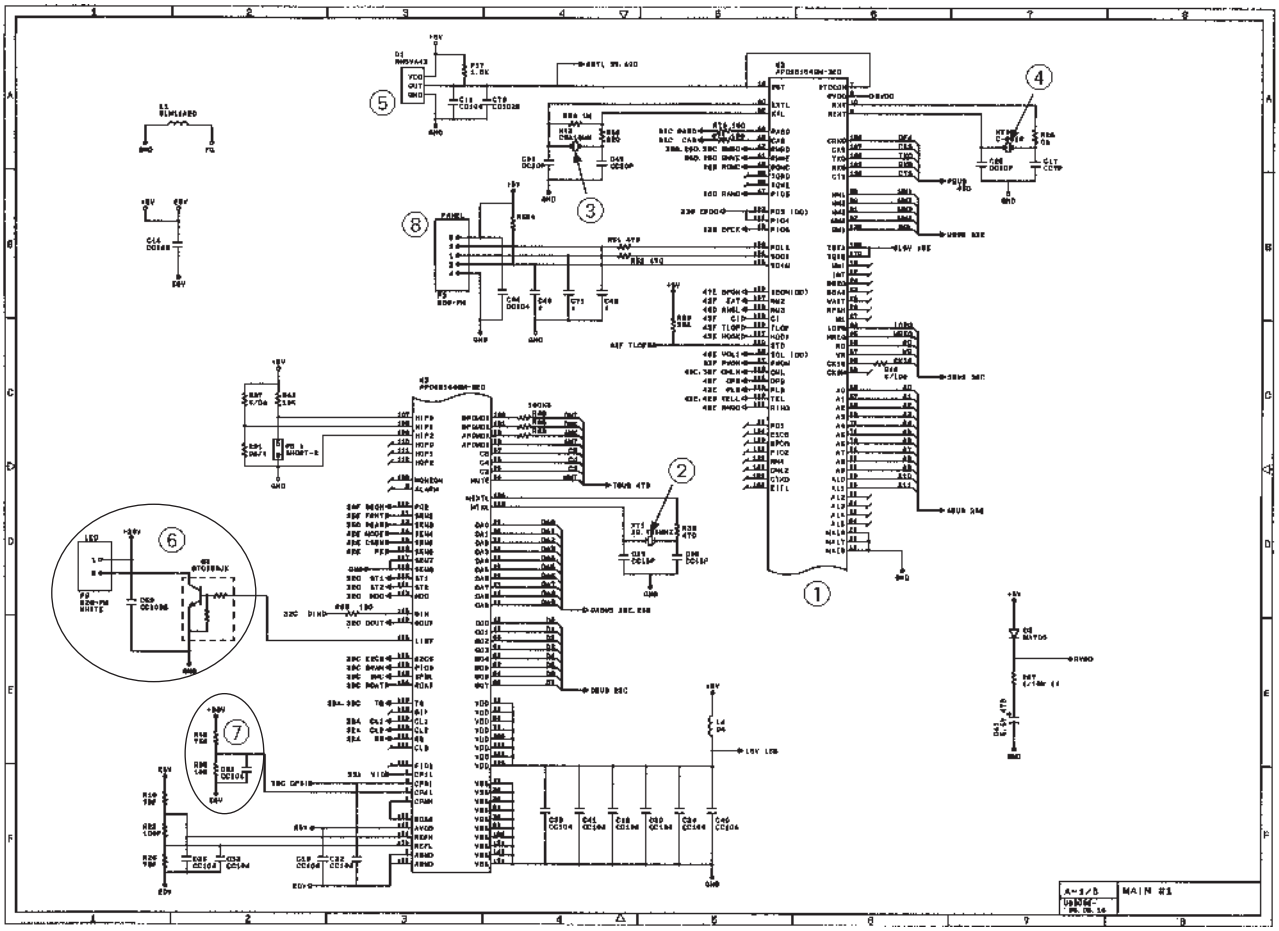


E^{2}PROM: Electrically Erasable Programmable Read-only Memory
DRAM: Dynamic Random Access Memory

Block Diagram of Main PCB

3.2.1 FAX100/570/615/625/635/675/575M/715M

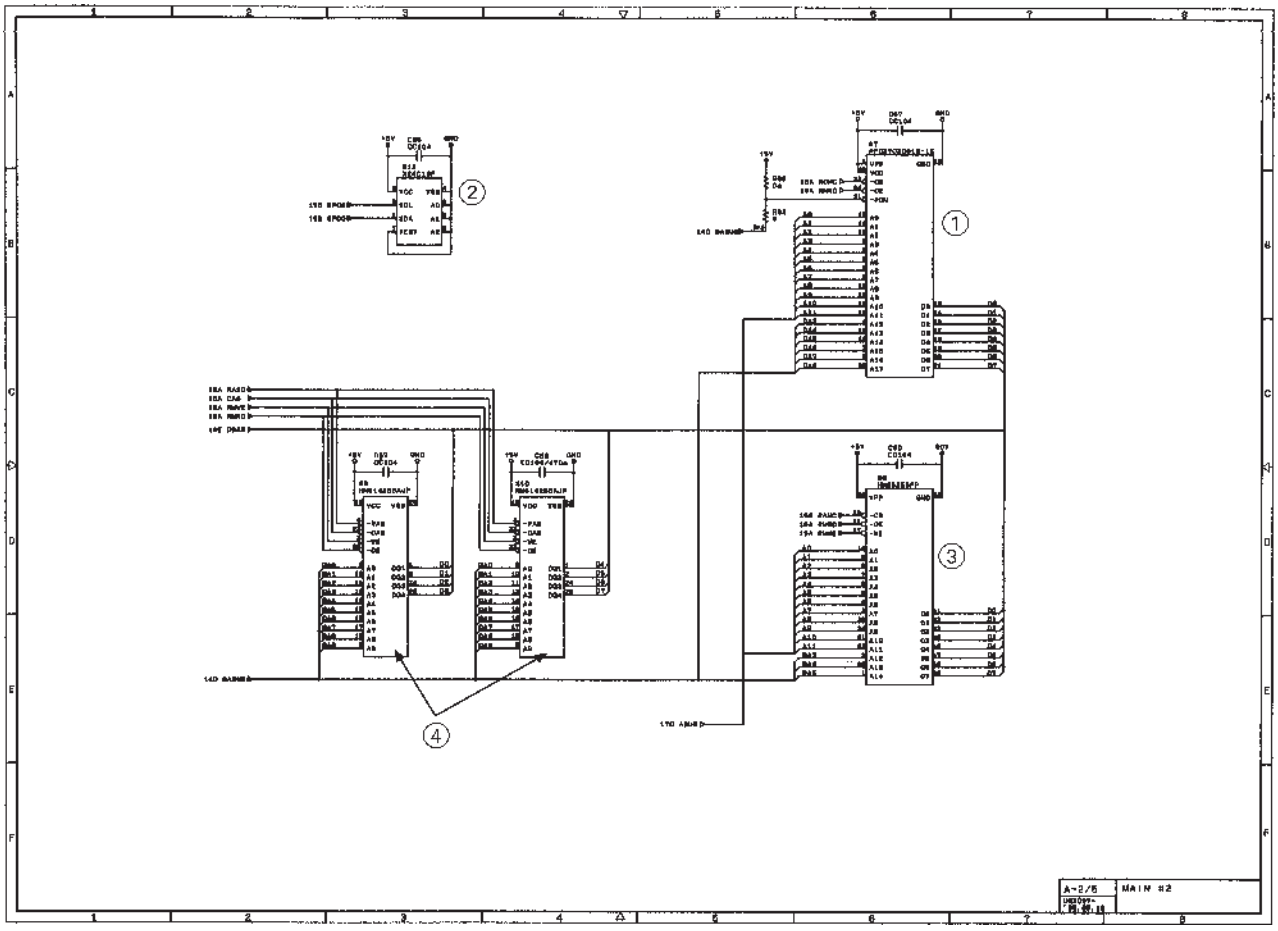
[1] Primary function group



Main PCB Circuit Diagram 1/4

① FAX engine (ASIC) which integrates a CPU, MODEM and gate array
② Clock for MODEM
③ Clock for CPU
④ Clock for calendar clock
⑤ Reset IC
⑥ LED array light intensity control circuit and connector
⑦ Recording head drive voltage detector
⑧ Control panel connector

[2] ROM and DRAM group



Main PCB Circuit Diagram 2/4

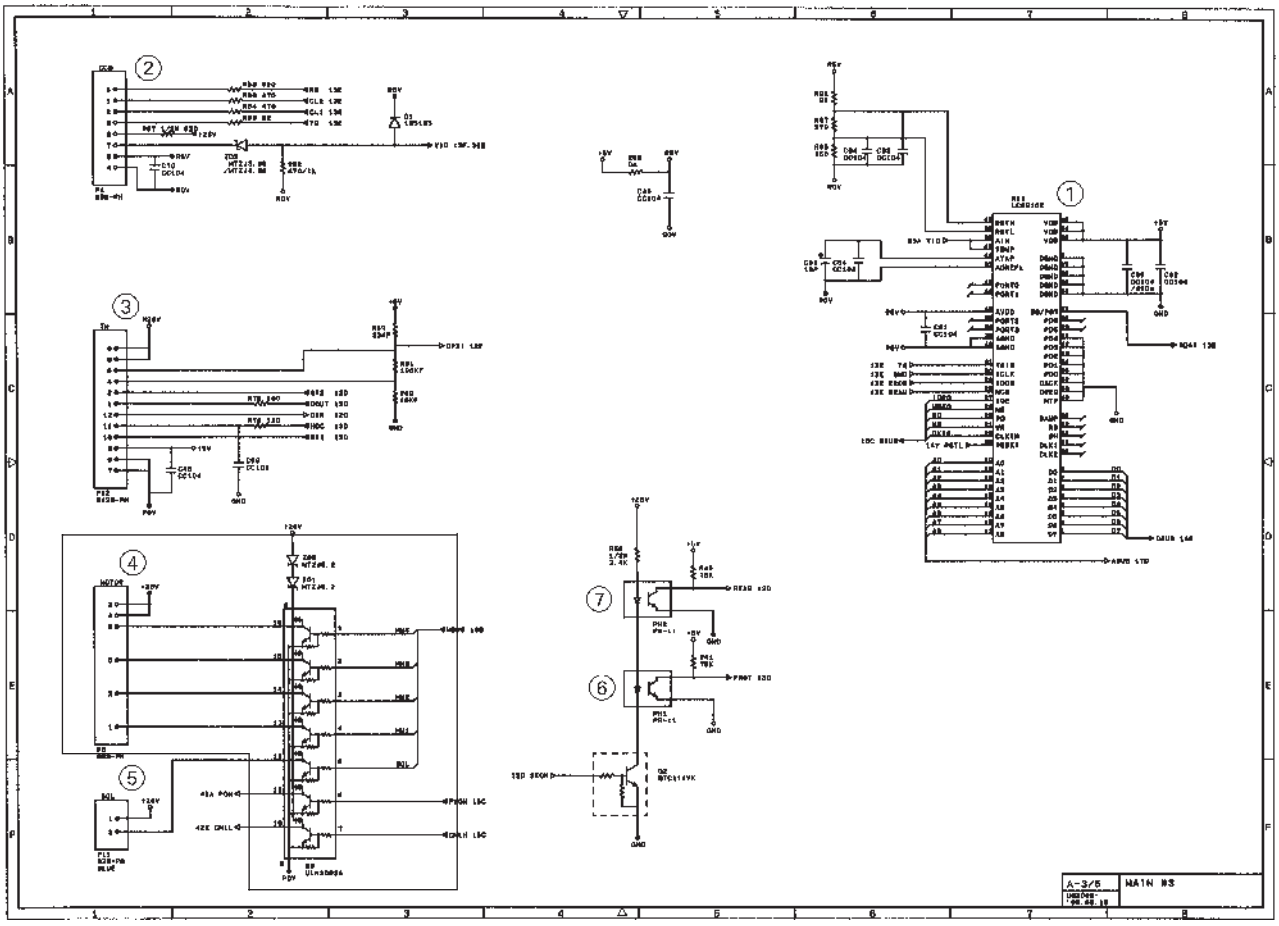
① ROM (2-megabit. Note that the sample machines for demonstration have a 4-megabit ROM.)

② E^2PROM (16-kilobit)

③ DRAM (256-kilobit) for the FAX100/570/615/625/635/675

④ DRAMs (256-kilobit) for the FAX575M/715M

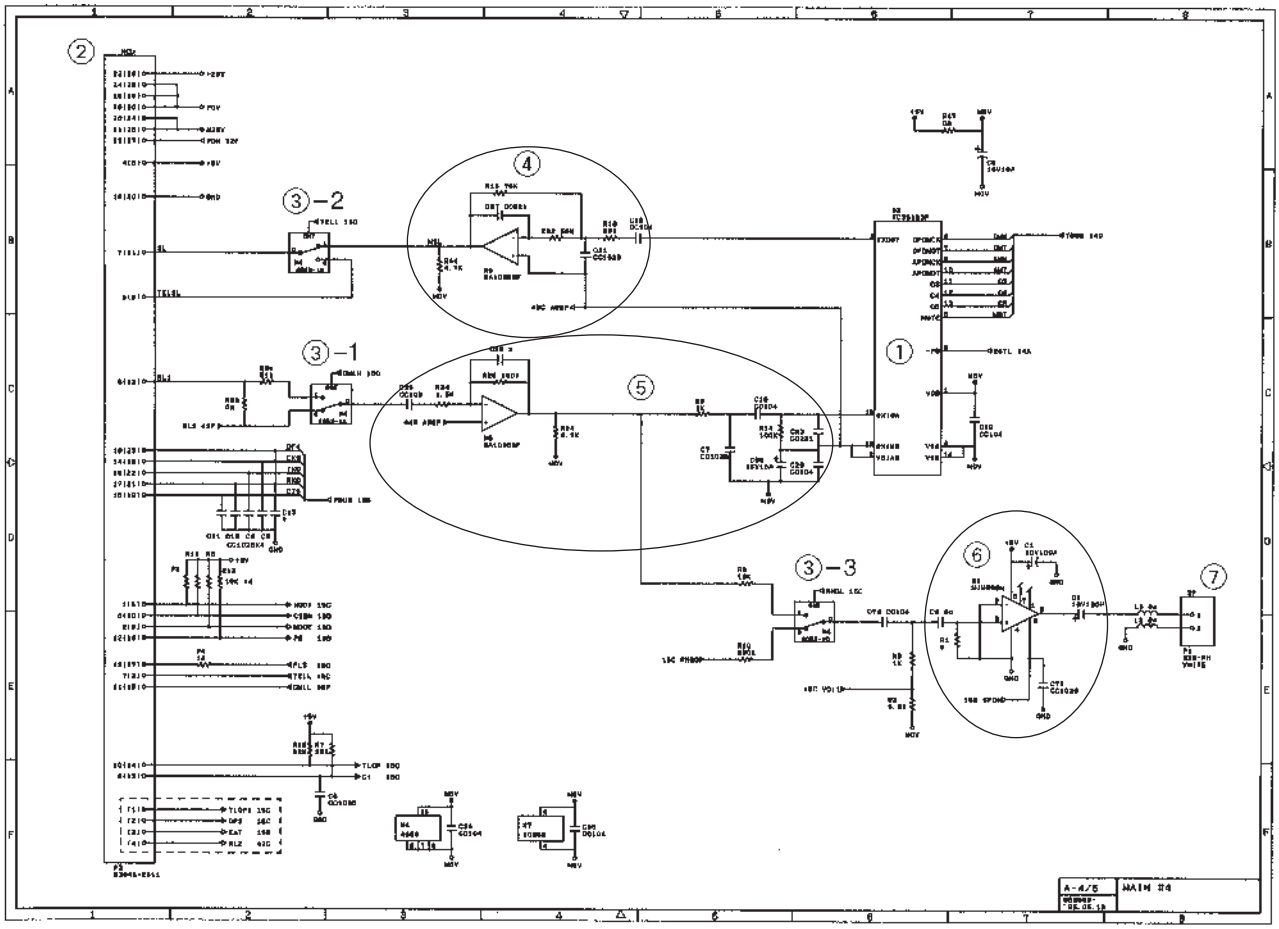
[3] Image processing group



Main PCB Circuit Diagram 3/4

① Image processor (Image processing IC)
② Connector for the CCD PCB
③ Recording head temperature detector and head connector
④ Motor driver and connector
⑤ Clutch solenoid connector
⑥ Document front sensor (photosensor)
⑦ Document rear sensor (photosensor)

[4] Analog signal processing group



Main PCB Circuit Diagram 4/4

① Analog front end IC

Processes the analog I/O signals from/to the MODEM.

② Main-NCU connector

③ Analog signal selectors

③-1: Selects either RL1 or RL2 signals inputted from the communications network.

③-2: Selects either input signals from the handset or those from the MODEM.

③-3: Selects either sound signals (e.g. alarm beeps, key clicks and ringer sounds) generated by the FAX engine or signals selected by ③-1.

④ Amplifier circuit for signals outputted from the MODEM

⑤ Amplifier & shaper circuit for signals inputted from the communications network

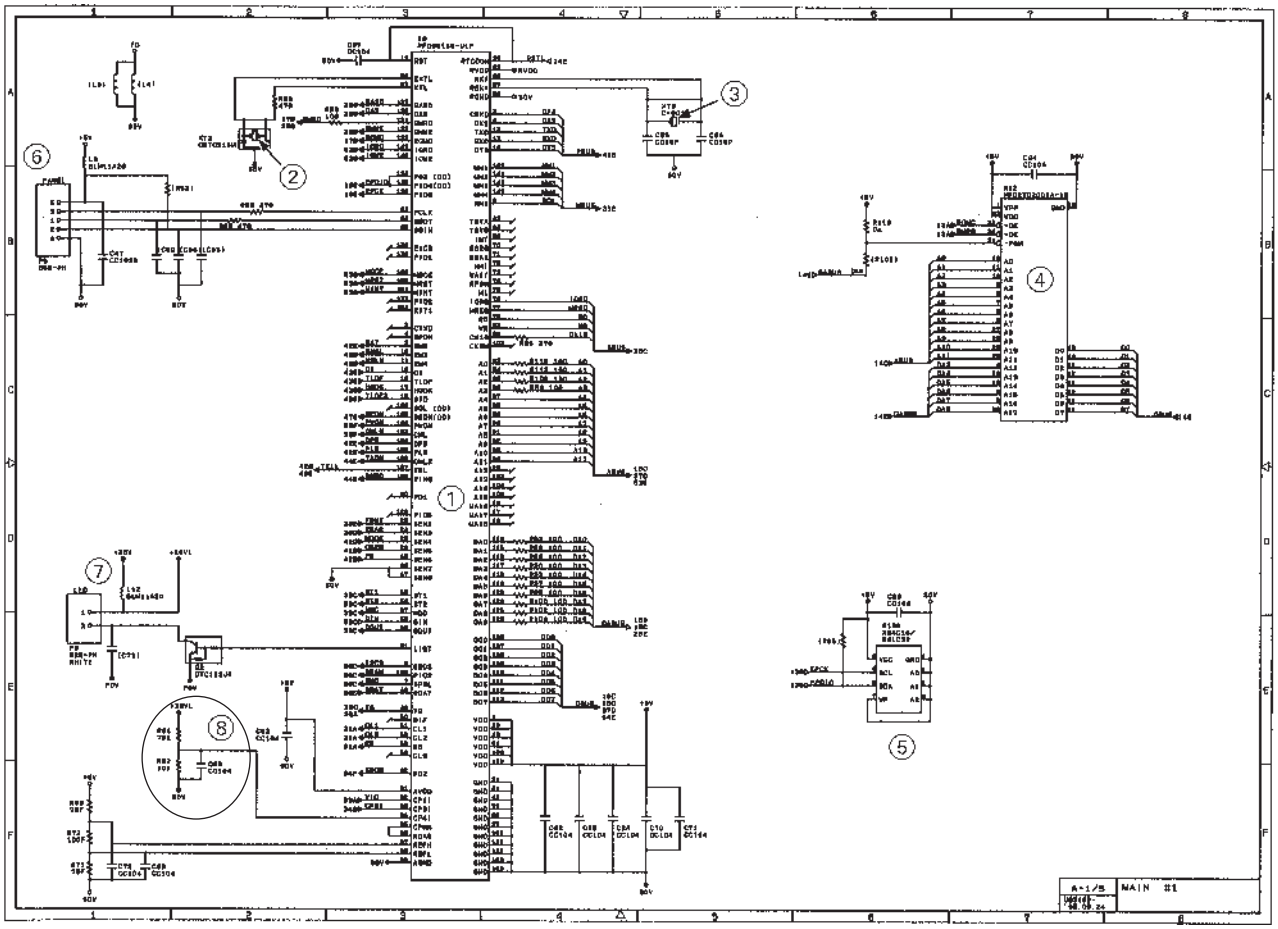
⑥ Speaker amplifier circuit

Amplifies sounds issued from the above analog signal selector (③) and feeds them to the speaker.

⑦ Speaker connector

3.2.2 FAX725M/590DT/590MC/825MC/875MC

[1] Primary function group



Main PCB Circuit Diagram 1/5

① FAX engine (ASIC) which integrates a CPU and gate array.

② Clock for CPU

③ Clock for calendar clock

④ ROM (2-megabit. Note that the sample machines for demonstration have a 4-megabit ROM.)

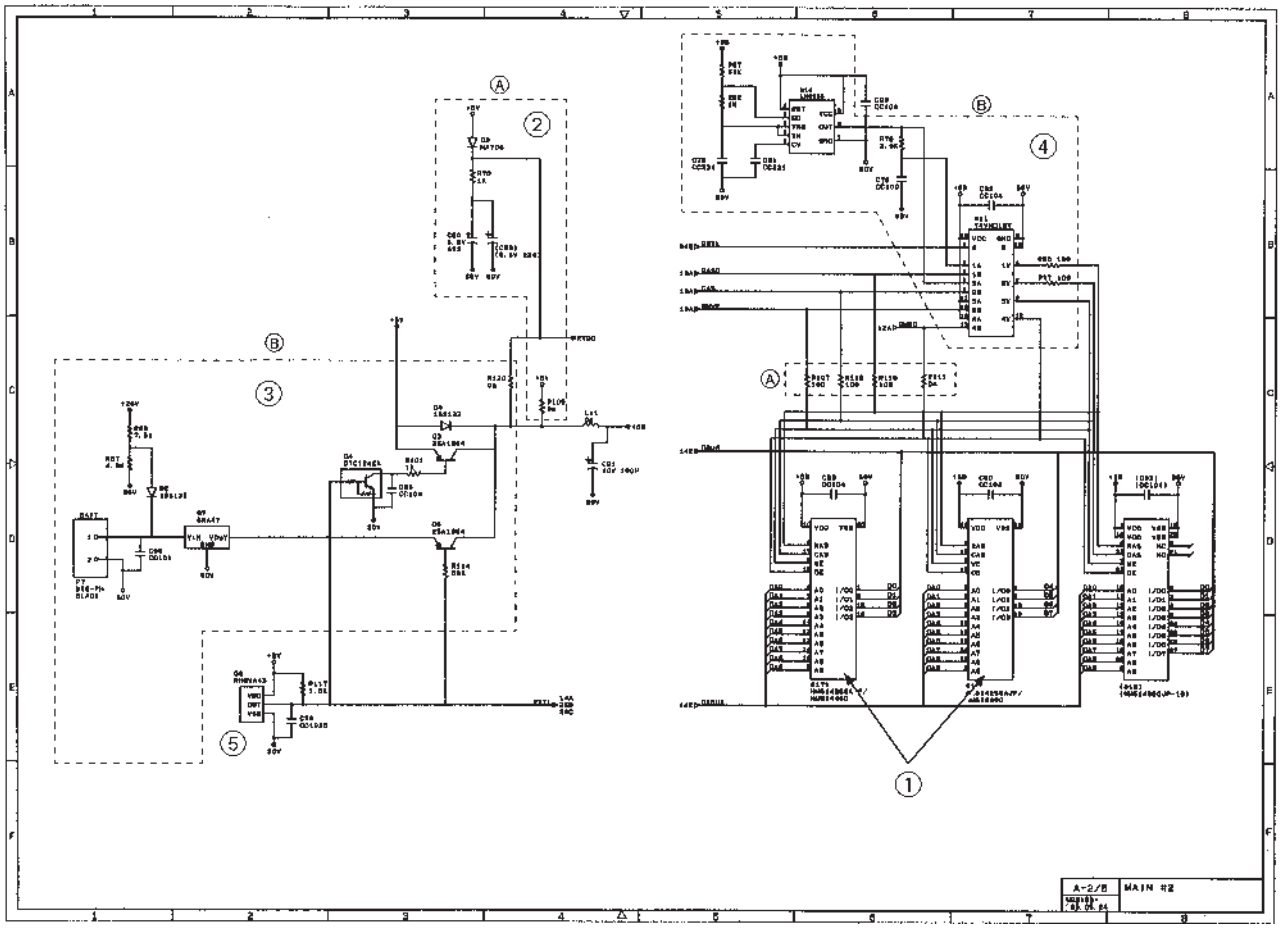
⑤ E^2PROM (16-kilobit in the FAX725M/590DT/590MC/825MC, 32-kilobit in the FAX875MC)

⑥ Control panel connector

⑦ LED array light intensity control circuit and connector

⑧ Recording head drive voltage detector

[2] DRAM group



Main PCB Circuit Diagram 2/5

① DRAMs

FAX725M: Two 256-kilobyte DRAMs

FAX590DT/590MC/825MC/875MC: Two 512-kilobyte DRAMs

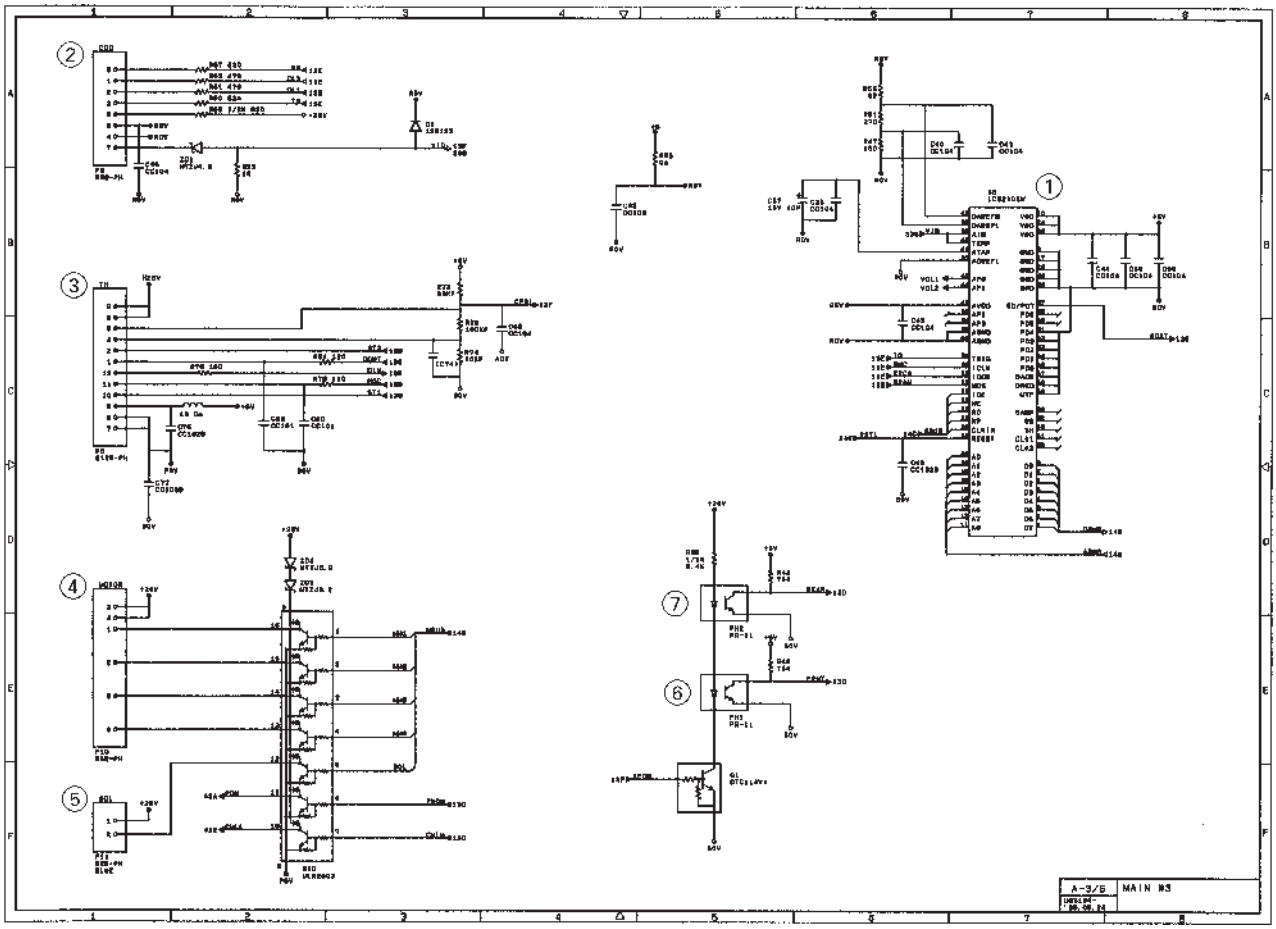
② Calendar clock backup circuit (for the FAX725M)

③ DRAM backup circuit and nickel-hydrogen battery connector (for the FAX590DT/590MC/825MC/875MC)

④ DRAM refresh circuit (for the FAX590DT/590MC/825MC/875MC)

⑤ Reset IC

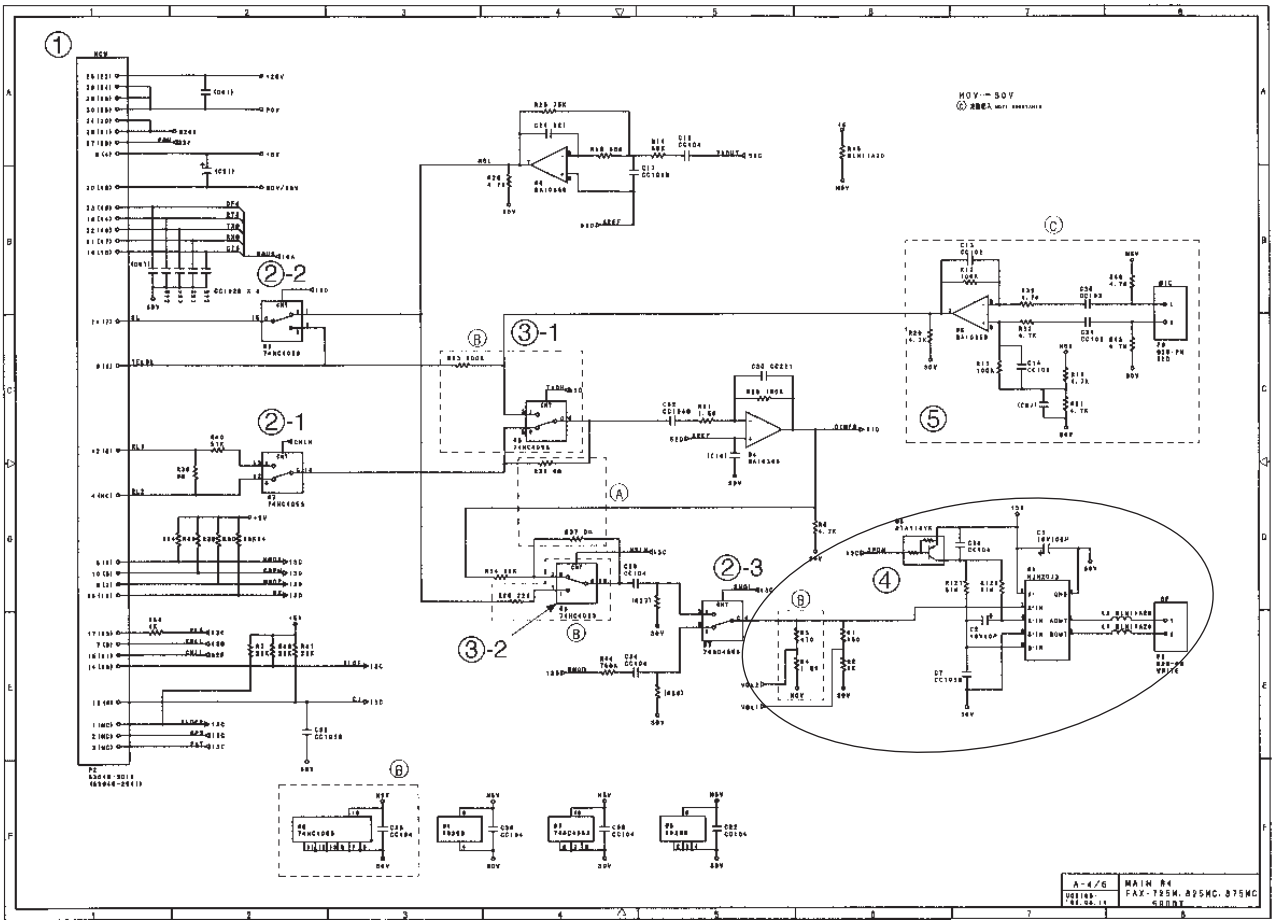
[3] Image processing group



Main PCB Circuit Diagram 3/5

① Image processor (Image processing IC)
② Connector for the CCD PCB
③ Recording head temperature detector and head connector
④ Motor driver and connector
⑤ Clutch solenoid connector
⑥ Document front sensor (photosensor)
⑦ Document rear sensor (photosensor)

[4] Analog signal processing group



Main PCB Circuit Diagram 4/5

① Main-NCU connector

② Analog signal selectors

②-1: Selects either RL1 or RL2 signals inputted from the communications network.

②-2: Selects either input signals from the handset or those from the MODEM.

②-3: Selects either sound signals (e.g. alarm beeps, key clicks and ringer sounds) generated by the FAX engine or signals selected by ②-1.

③ Voice switching analog selectors

③-1: Selects either input signals from the communications network or those from the MODEM, then feeds them to the speaker.

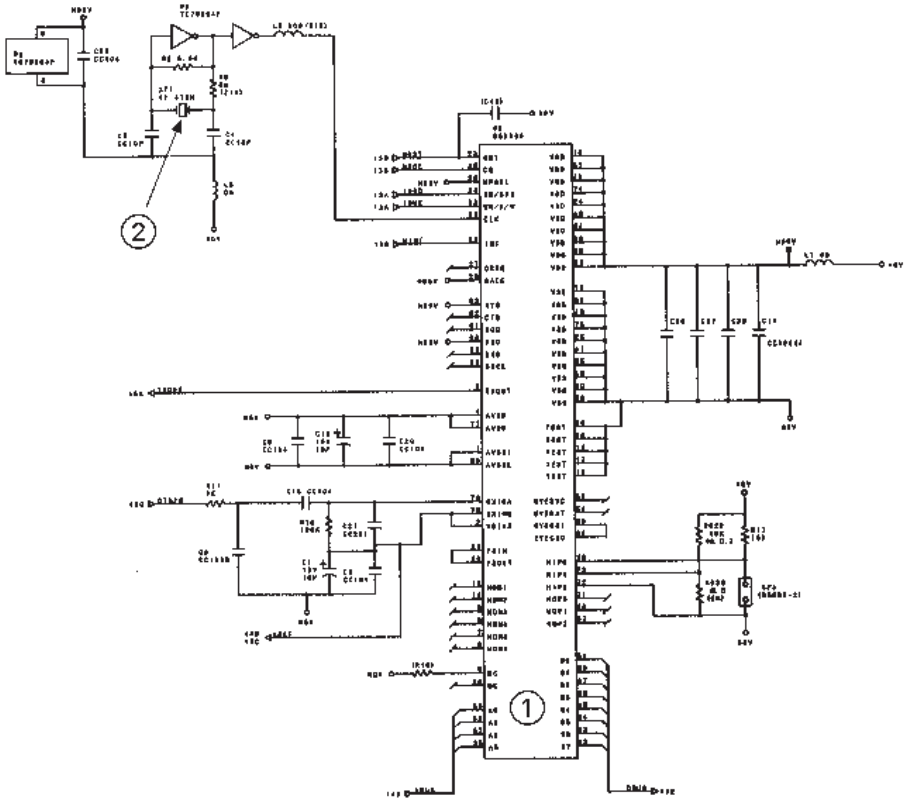
③-2: Selects either signals inputted from the communications network or recorded voice signals inputted from the microphone or handset, then feeds them to the MODEM.

④ Speaker output circuit and connector

⑤ Microphone connector and voice signal amplifier circuit

The voice signal amplifier circuit is applicable in those countries where telephones can be used to call even during power failures.

[5] MODEM



Main PCB Circuit Diagram 5/5

① MODEM

② Clock for MODEM

3.3 NCU PCB

The NCU PCB switches the communications line to telephone or built-in MODEM, under control of the main PCB. Also, it works as a power supply interface from the power supply unit to the main PCB and the recording head.

As shown in the circuit diagrams on the next page, the NCU PCB consists of the components listed below:

① Surge absorber
② Noise filter
③ Line relay (CML relay)
④ Line transformer
⑤ Circuit related to line transformer
⑥ High-impedance transformer circuit
⑦ Calling signal detector
⑧ Loop current detector
⑨ Dial pulse generator
⑩ Telephone circuit
⑪ Recording head interface

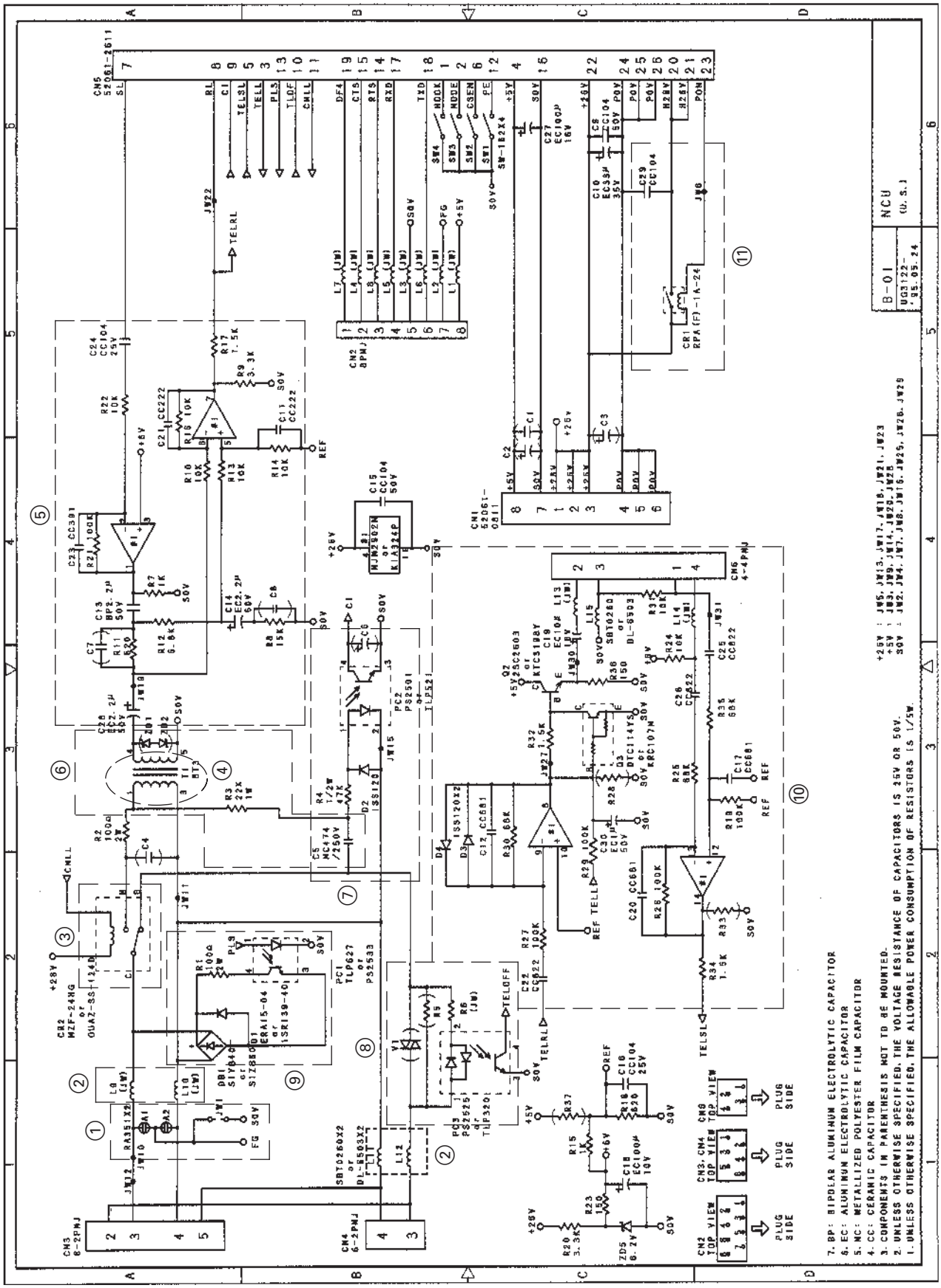
- The primary function of the NCU which is shared by facsimile and telephone units is to switch a line to the facsimile unit or to the telephone, which is carried out by the line relay.
- Since the direct connection of a facsimile equipment to the line is not allowed for protecting the line, it is essential to insert a line transformer between the line and the facsimile equipment to insulate them each other in direct current band.

The above two components, a line relay and a line transformer, are the minimum requirements for the NCU of the facsimile equipment.

- If an external telephone is attached to the facsimile equipment, the NCU should have a loop current detector to identify the hook state by detecting loop current.
- If the facsimile equipment has an automatic answering facility, the NCU should be equipped with a calling signal detector which detects a calling signal and tells it to the CPU in the FAX engine.
- The circuit related to a line transformer allows the line transformer to be invariant by selecting the constants of the parts in this circuit so as to conform to the communications regulations or codes of each country.

In addition to the above basic components of the NCU, the following components are also required depending upon additional functions of the facsimile equipment:

- The dial pulse generator generates dial pulses within the facsimile equipment.
- The surge absorber is a protection circuit which absorbs lightning surge.
- The noise filter eliminates noise including radiation noise to prevent them from flowing out onto the communications line.
- The high-impedance transformer circuit detects the remote activation, and F/T switching sent from the line in ON-HOOK state without any interference to the line.
- The telephone circuit includes two amplifiers; one for amplifying the output signals of the handset microphone and the other for amplifying the receive signals from the communications lines to sound the handset receiver.



NCU Circuit Diagram

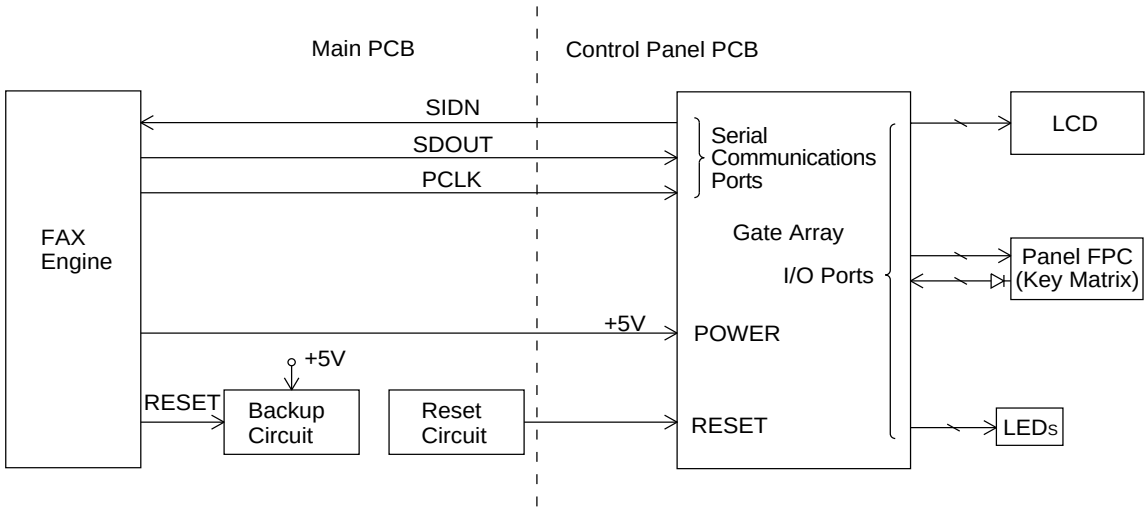
3.4 Control Panel PCB

The control panel PCB and the main PCB communicate with each other by serially transmitting commands and data.

The control panel unit consists of a gate array, an LCD, and LEDs, which are controlled according to commands issued from the FAX engine on the main PCB.

The calendar clock is backed up by the backup circuit on the main PCB.

The panel FPC is a flexible keyboard PCB which integrates the key matrix having rubber keytops.



Control Panel PCB and its Related Circuit

3.5 Power Supply

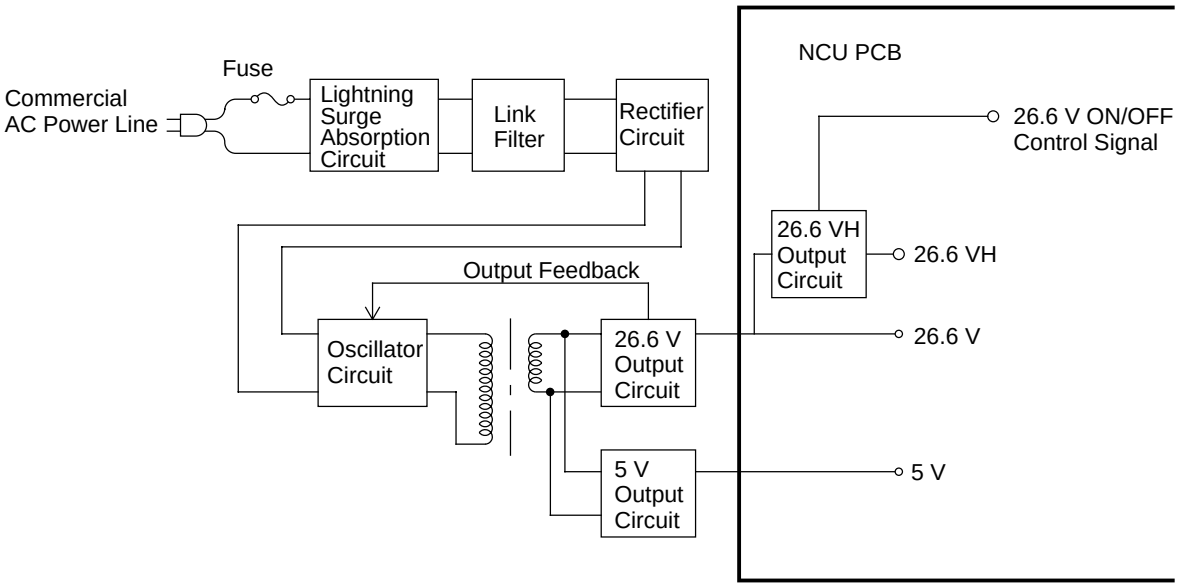
The power supply uses the switching regulation system to generate the required DC power (+5V and +26.6V) from the commercial AC power supply.

The 26.6V power source is fed to the NCU PCB where the +26.6VH source is generated.

The 26.6VH power source, which drives the recording head, outputs 26.6 VDC only when the 26.6V ON/OFF control signal sent from the main PCB turns High.

The 26.6V power source mainly drives the motor for feeding documents and recording paper.

Signals other than +26.6VH are connected to the main PCB through the NCU PCB and +26.6VH is fed to the recording head.



Power Supply Circuit

CHAPTER IV.

INDICATION AND INFORMATION PRINTOUT OF ERROR

CONTENTS

1. INDICATION AND PRINTOUT OF ERROR IV-1

2. EQUIPMENT ERROR IV-1

2.1 Error Messages on the LCD IV-1

2.2 Error Codes Shown in the “MACHINE ERROR xx” message IV-2

3. COMMUNICATIONS ERROR IV-4

3.1 Definition of Error Codes on the Communications List IV-5

1. INDICATION AND PRINTOUT OF ERROR

To help the user or the service personnel promptly locate the cause of a problem (if any), the facsimile equipment incorporates the self-diagnostic functions which display error messages for equipment errors and communications errors.

For the communications errors, the equipment also prints out the transmission verification report and the communications list.

2. EQUIPMENT ERROR

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see Section 2.1. As one of the error messages, "MACHINE ERROR xx" includes an error code which indicates the detailed error causes listed in Section 2.2. To display an error code for other latest error message, make the equipment enter the maintenance mode and press [8] and [2] keys (for details, refer to Chapter V, Subsection 3.3.9).

2.1 Error Messages on the LCD

Messages on the LCD	Probable Cause
PAPER ROLL EMPTY	The paper empty (PE) sensor detects that no recording paper is present.
PRINTER JAM	The recording paper failed to return to the printing position after it had been cut.
COVER OPEN	The cover sensor detects that the the recording paper cover is not closed.
DOCUMENT JAM	■ Document jam (1) The document length exceeds the limitation (400 or 90 cm) registered by firmware switch WSW16. (Refer to Chapter V, Subsection 3.3.5.) (Both the document front and rear sensors stay ON after the document has been fed by the registered length.) (2) The document rear sensor detects no trailing edge of a document after the document has been fed by 400 cm. (The document rear sensor stays ON even after the document has been fed when the document front and rear sensors were OFF and ON, respectively.)

Messages on the LCD	Probable Cause
DOCUMENT JAM	■ Document loading error (1) The document rear sensor detects no leading edge of a document within 10 seconds from the start of document loading operation. (The document rear sensor stays OFF even after the document has been fed when the document front sensor was ON.) (2) The loaded document is too short. (Since the document is shorter than the distance between the document front and rear sensors, the document front sensor is turned OFF before the document rear sensor is turned ON.)
CUTTER JAM	The upper rotary blade of the automatic cutter failed to return to the home position within the specified time after cutting the recording paper.
CLEAN UP SCANNER	In the scanning compensation data list printed by the maintenance-mode function No. 05, less than fifty percent of the white level data is faulty.
SCANNER ERROR	In the scanning compensation data list printed by the maintenance-mode function No. 05, fifty percent or more of the white level data is faulty.
PRINTER FAULT	The thermistor in the recording head caused a heat error.
MACHINE ERROR xx	"xx" indicates an error code. Refer to Section 2.2.

If only an alarm beep is heard without any message on the LCD when the equipment is powered up, the ROM or RAM will be defective.

2.2 Error Codes Shown in the "MACHINE ERROR xx" message

Error Code xx (Hex.)	Error factor
82	Recording paper feeding error.
87	Fails to complete the sequence of recording operation.
(89	Cutter jam.)
8A	Wrong or weak contact of the recording head connectors.
(8B	Recording head overheat.)
(A1	Recording paper cover opened.)
(A2	Document too long to scan.)
(A3	Document not detected by the document rear sensor.)
(A4	50% or more faulty of white level data.)

Error codes in parentheses do not appear in the "MACHINE ERROR xx", since those errors are displayed as messages described in Section 2.1. Those error codes appear in the communications error list if an equipment error occurs during communications. Refer to Section 3.1, (13).

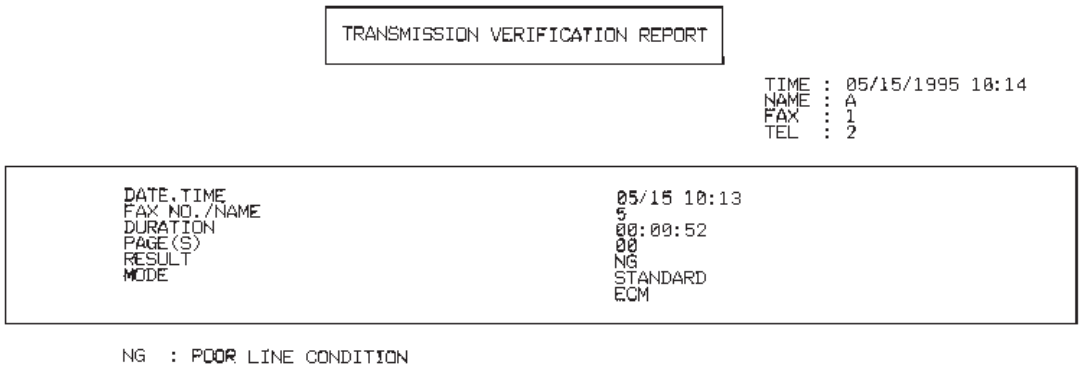
Error Code xx (Hex.)	Error factor
A5	Faulty operation of DMA0 during scanning.
A6	Faulty operation of DMA1 during scanning.
A7	One-line feeding time-out error.
A8	One-line scanning time-out error.
A9	Abnormal scanning reference voltage.
AB	Document feed-in amount measuring error.
AC	Less than 50% faulty of white level data.
B1	CODEC LSI error.
(B8	Amplifier gain error.)
(B9	Light emission intensity error of the LED array.)
(BA	Scanning error: The left-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)
(BB	Scanning error: The right-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)
(BC	Scanning error: Reduction miss)
(BD	Scanning error: Enlargement miss)
D1	The MODEM setup bit sticks to High.
D2	CTS stays OFF or ON if the MODEM RTS is turned ON or OFF, respectively.
D3	Bit B1A of the MODEM stays OFF.
D4	Bit RX of the MODEM stays OFF.
D5	The MODEM fails to complete the command transmission sequence.
D6	No MODEM interrupt for 60 seconds.
E1	Microprocessor (MPU) error on the control panel PCB.
(E4	Out of recording paper.)
(E5	Recording paper set error.)
E6	Write error in E^2PROM.
E8	Data scanning error during transmission.
(EA	Document removed at phase B.)
F3	Voice message recording or playing-back not started.
F5	EOL not found in page memory transmission mode.
FF	Interface error of page memory command.

Error codes in parentheses do not appear in the “MACHINE ERROR xx”, since those errors are displayed as messages described in Section 2.1. Those error codes appear in the communications list if an equipment error occurs during communications. Refer to Section 3.1, (13).

3. COMMUNICATIONS ERROR

If a communications error occurs, the facsimile equipment

(1) emits an audible alarm (intermittent beeping) for approximately 4 seconds,
(2) displays the corresponding error message, and
(3) prints out the transmission verification report if the equipment is in sending operation.



TRANSMISSION VERIFICATION REPORT

TIME : 05/15/1995 10:14
NAME : A
FAX : 1
TEL : 2

DATE.TIME	05/15 10:13
FAX NO./NAME	5
DURATION	00:00:52
PAGE(S)	00
RESULT	NG
MODE	STANDARD ECM

NG : POOR LINE CONDITION

Transmission Verification Report Sample

3.1 Definition of Error Codes on the Communications List

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected. *
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	No tone detected after dialing.
17	07	No response from the remote station in receiving.

* Available in Germany and Austria only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected (“1” in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answer back.
20	07	Undefined command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mail box function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.

(4) Instructions received from the remote terminal [checking the NSC, DTC, NSS, and DCS]

Code 1	Code 2	Causes
40	02	Illegal coding system requested.
40	03	Illegal recording width requested.
40	05	ECM requested although not allowed.
40	06	Polled while not ready.
40	07	No document to send when polled.
40	10	Nation code or manufacturer code not coincident.
40	11	Unregistered group code entered for relay broadcasting function, or the specified number of broadcasting subscribers exceeding the limit.
40	12	Retrieval when not ready for retrieval.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.

(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

(6) ID checking

Code 1	Code 2	Causes
63	01	Password plus (lower 4 digits of telephone number) not coincident.
63	02	Password not coincident.
63	03	Polling ID coincident.
63	04	Entered confidential mail box ID uncoincident with the mail box ID.
63	05	Relay broadcasting ID not coincident.
63	06	Entered retrieval ID uncoincident with that of the mail box ID.

(7) DCN reception

Code 1	Code 2	Causes
74		DCN received.

(8) TCF transmission/reception

Code 1	Code 2	Causes
80	01	Fallback impossible.

(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: Five seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found and command detected for 60 seconds.
A8	01	RTN, PIN, or ERR received at the calling terminal. *
A9	01	RTN, PIN, or ERR received at the called terminal. *
AA	18	Receive buffer full during receiving into memory.

* Available in Germany and Austria only.

(11) General communications-related

Code 1	Code 2	Causes
B0	01	Polarity inversion detected.
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.
E0	03	Failed to detect any command from the RS-232C interface in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	xx	Equipment error (For xx, refer to Section 2.2.)

CHAPTER V.

MAINTENANCE

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1. DISASSEMBLY AND REASSEMBLY

■ Safety Precautions

To prevent the creation of secondary problems by mishandling, observe the following precautions during maintenance work.

(1) Always turn off the power before replacing parts or units. When having access to the power supply, be sure to unplug the power cord from the power outlet.

(2) Be careful not to lose screws, washers, or other parts removed for parts replacement.

(3) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.

(4) Before handling the PCBs, touch a metal portion of the equipment to discharge static electricity, or the electronic parts may be damaged due to the electricity charged in your body.

(5) When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.

(6) Be sure to reinsert self-tapping screws correctly, if removed.

(7) Unless otherwise specified, tighten screws to the torque values listed below.

- Tapping screws
  - M2.6 : 3.5 kgf•cm
  - M3 x 8 : 5 kgf•cm
  - M3 x 10 : 7 kgf•cm
- Sems screws M3 (Screws with washer) : 7 kgf•cm
- Stepped screws : 7 kgf•cm

(8) When connecting or disconnecting cable connectors, hold the connector bodies not the cables. If the connector has a lock, always slide the connector lock to unlock it.

(9) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.

■ Preparation

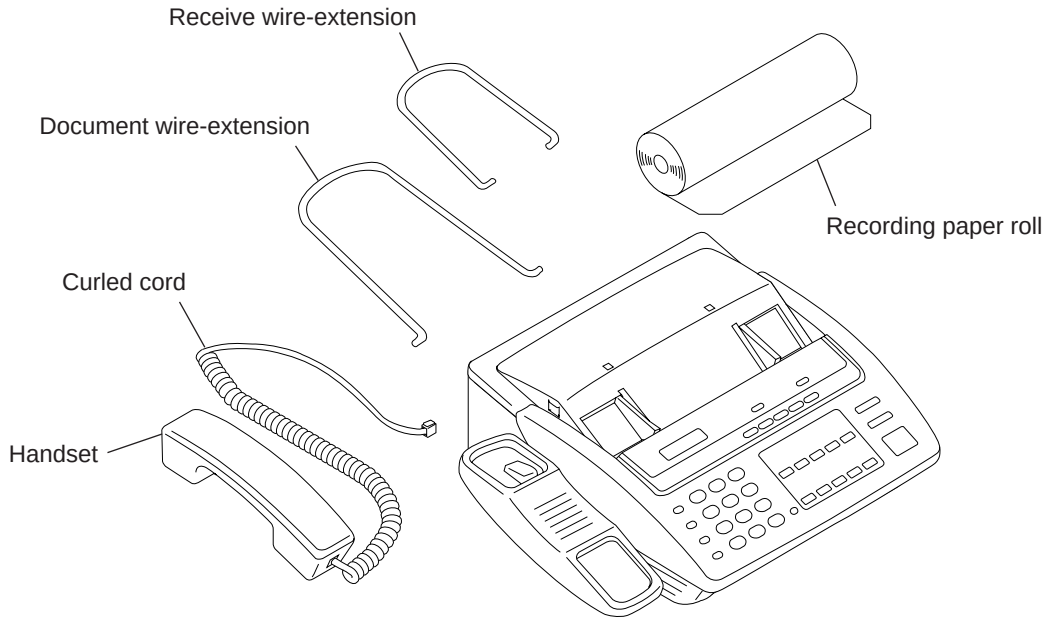
Prior to proceeding to the disassembly procedure,

(1) Unplug the modular jack of the telephone line.

(2) Unplug modular jacks of external telephone sets if mounted.

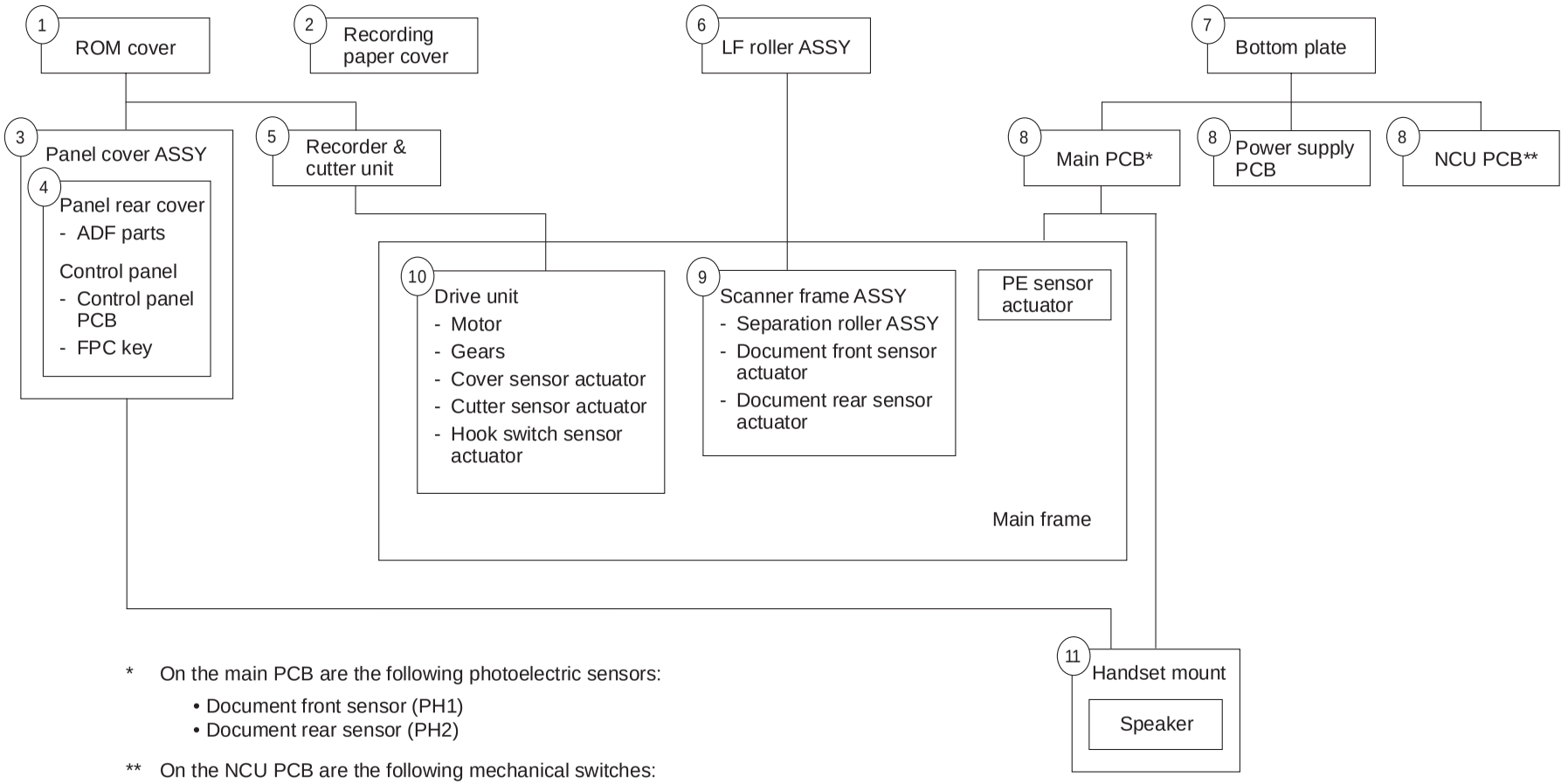
(3) Unplug the modular jack of the curled cord and remove the handset. (See below.)

(4) Remove the recording paper roll, the document wire-extension, and the receive wire-extension. (See below.)



■ How to Access the Object Component

- On the next page is a disassembly order flow which helps you access the object component. To remove the scanner frame ASSY, for example, first find it on the flow and learn its number (⑨ in this case). You should remove parts numbered ⑥ through ⑧ so as to access the scanner frame ASSY.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.



* On the main PCB are the following photoelectric sensors:

- Document front sensor (PH1)
- Document rear sensor (PH2)

** On the NCU PCB are the following mechanical switches:

- PE sensor (SW1)
- Cover sensor (SW2)
- Cutter sensor (SW3)
- Hook switch sensor (SW4)

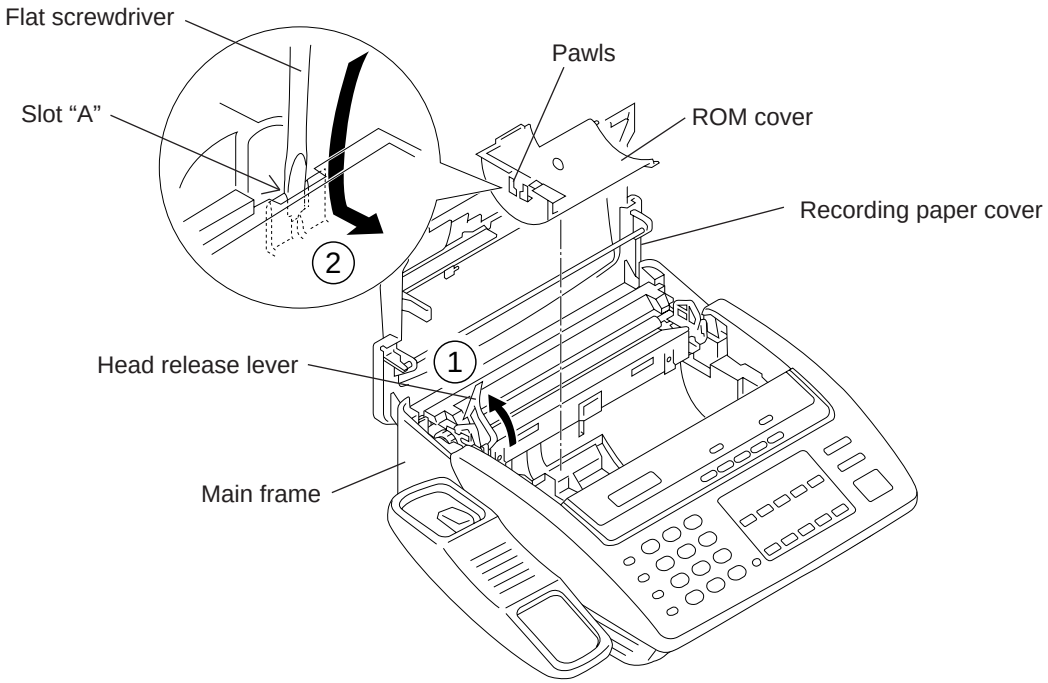
1.1 ROM Cover

(1) Open the recording paper cover.

(2) Turn up the head release lever.

(3) Insert the tip of a flat screwdriver into slot “A” to release two pawls of the ROM cover from the main frame.

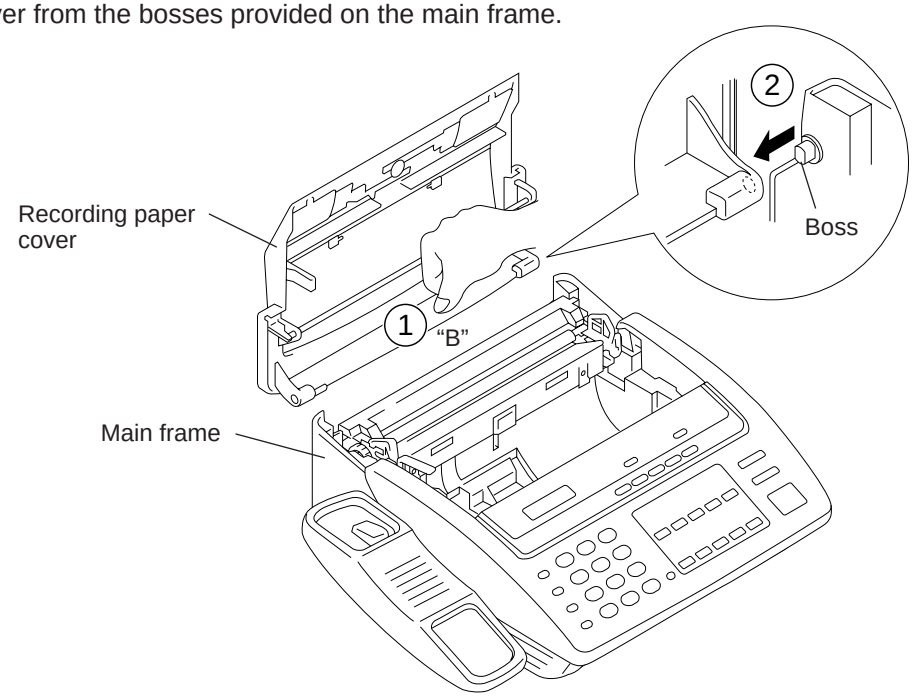
(4) Lift up the ROM cover.



1.2 Recording Paper Cover

(1) Open the recording paper cover.

(2) As shown below, press section “B” with your thumb to release the recording paper cover from the bosses provided on the main frame.

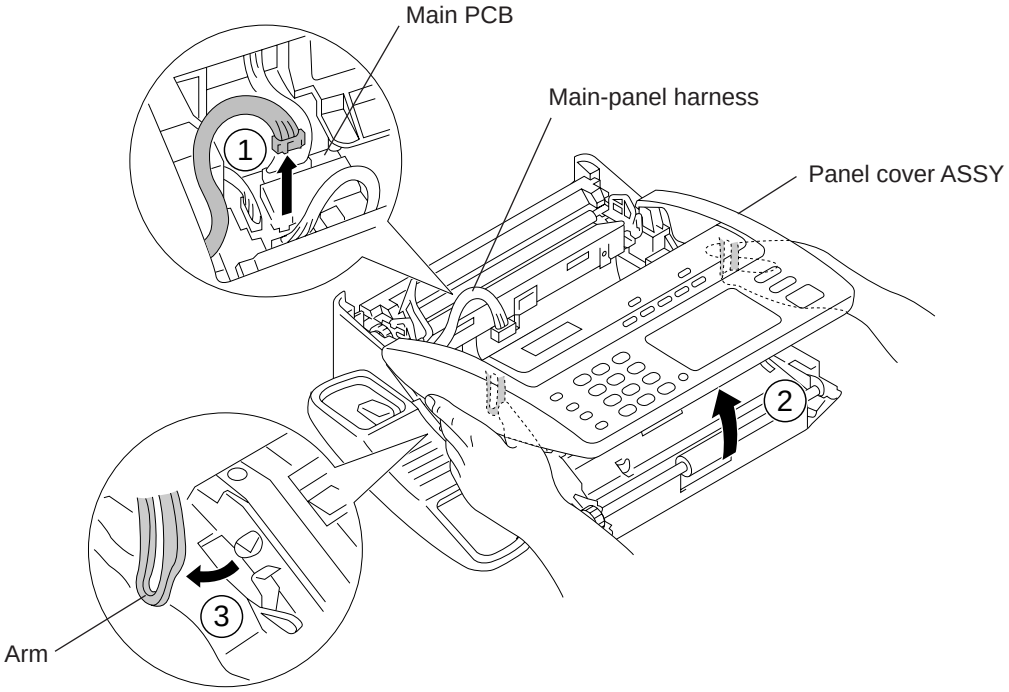


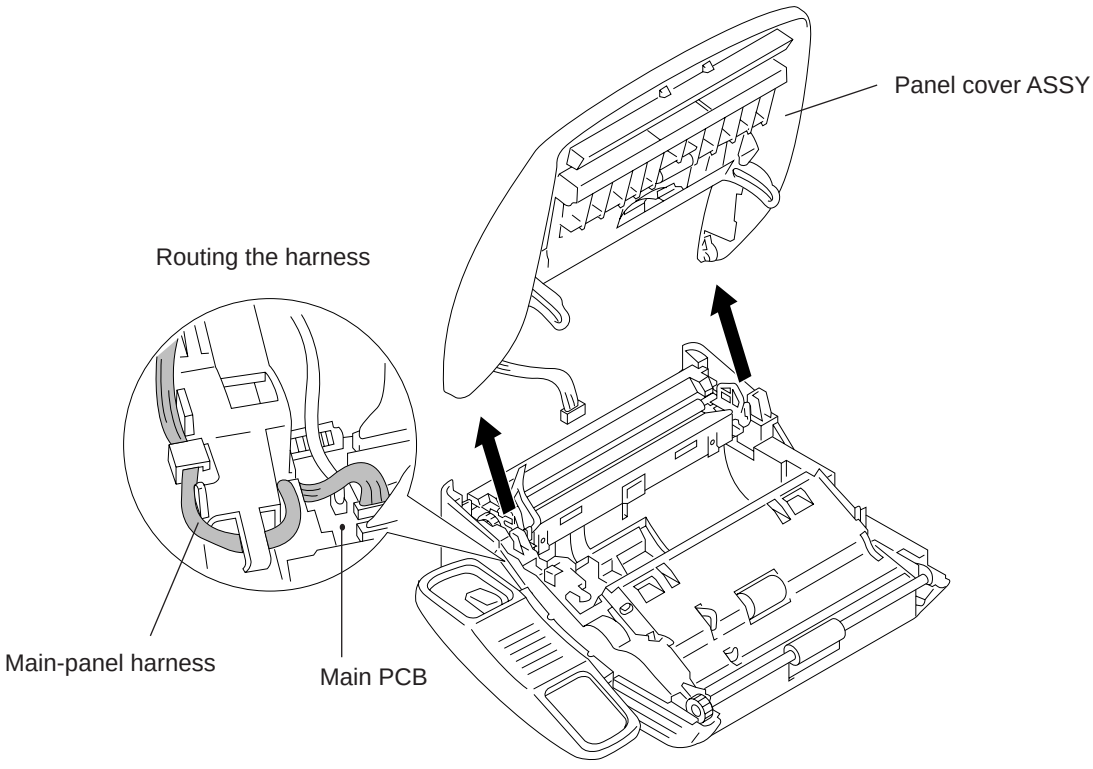
1.3 Panel Cover ASSY

(1) Disconnect the main-panel harness from the main PCB.

(2) Slightly open the panel cover ASSY.

(3) Push the right and left arms of the panel cover ASSY outwards with you thumbs as shown below to unhook them from the bosses provided on the main frame, then open the panel cover ASSY further.





1.4 Panel Rear Cover and Control Panel

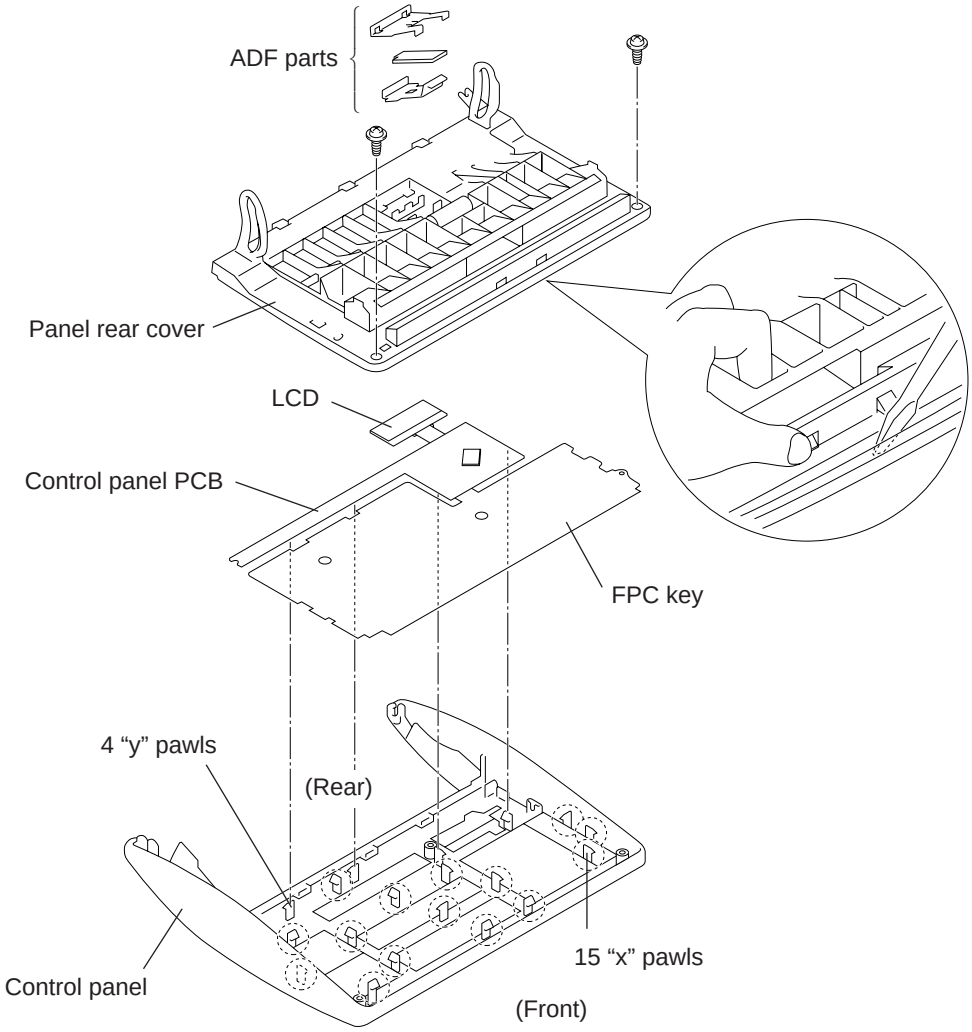
(1) Place the panel cover ASSY upside down.

(2) Remove the ADF parts from the panel rear cover.

(3) Remove the two screws.

(4) Insert the tip of a flat screwdriver into the slot between the panel rear cover and control panel as shown below and unhook the panel rear cover from the 15 “x” pawls provided on the control panel.

(5) To remove the control panel PCB, FPC key and LCD, unhook the PCB from the four “y” pawls provided on the control panel.



■ Reassembling Notes

- When installing the panel rear cover to the control panel, first fit the rear edge into place and then snap in the panel rear cover.

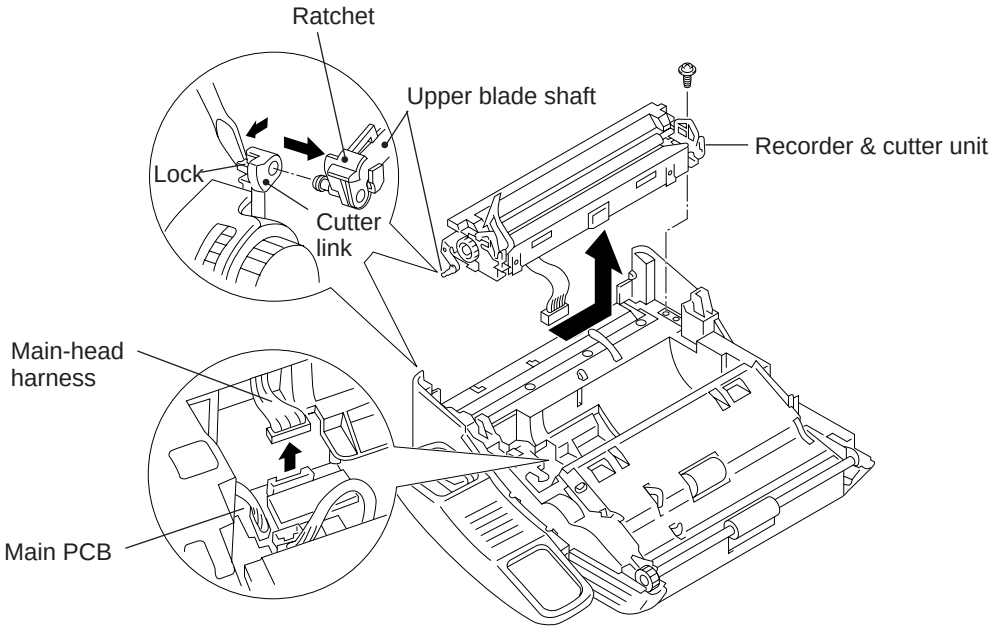
1.5 Recorder & Cutter Unit

(1) Disconnect the main-head harness from the main PCB.

(2) Remove the screw from the recorder & cutter unit.

(3) Release the lock of the cutter link and pull out the upper blade shaft from it.

(4) Pull up the recorder & cutter unit which is attached to the main frame with double-sided adhesive tape, then remove it in the direction of the arrow shown below.



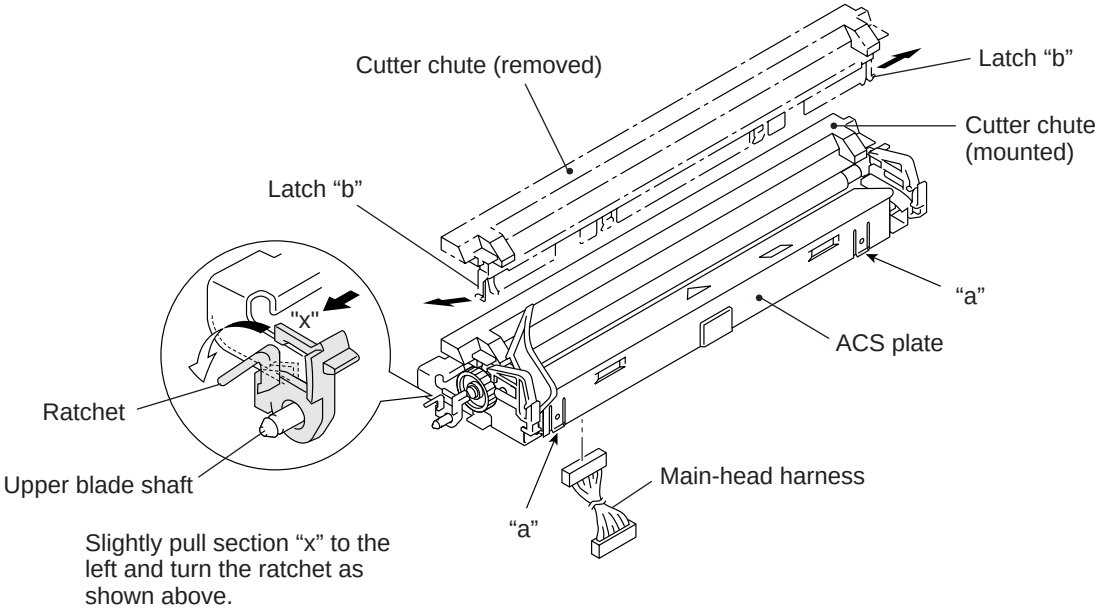
■ Disassembly of recorder & cutter unit

1) Disconnect the main-head harness from the recorder PCB.

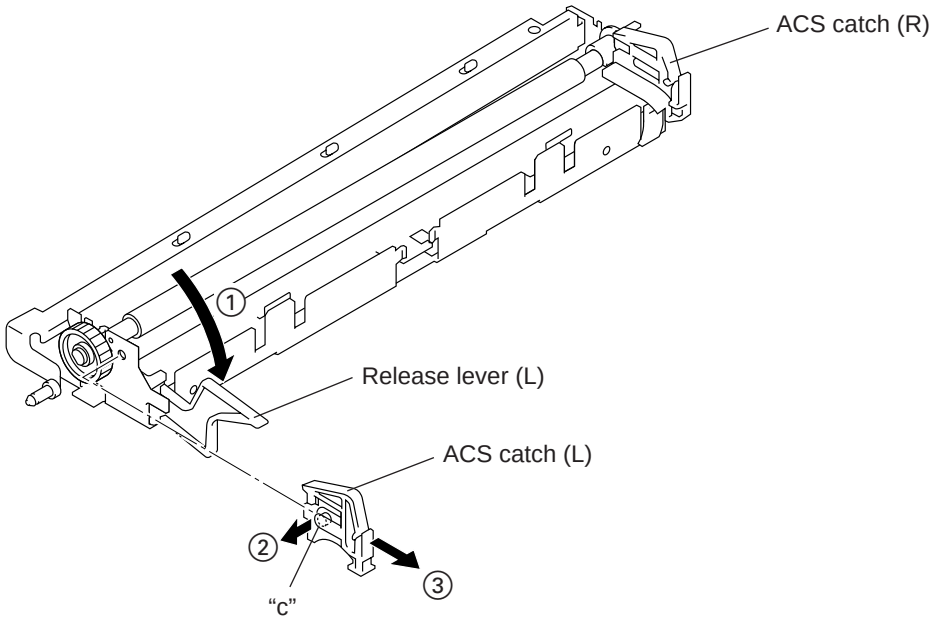
2) Remove the ratchet from the upper blade shaft, taking care not to deform it.

3) Slide the ACS plate upwards while pulling sections “a” towards you.

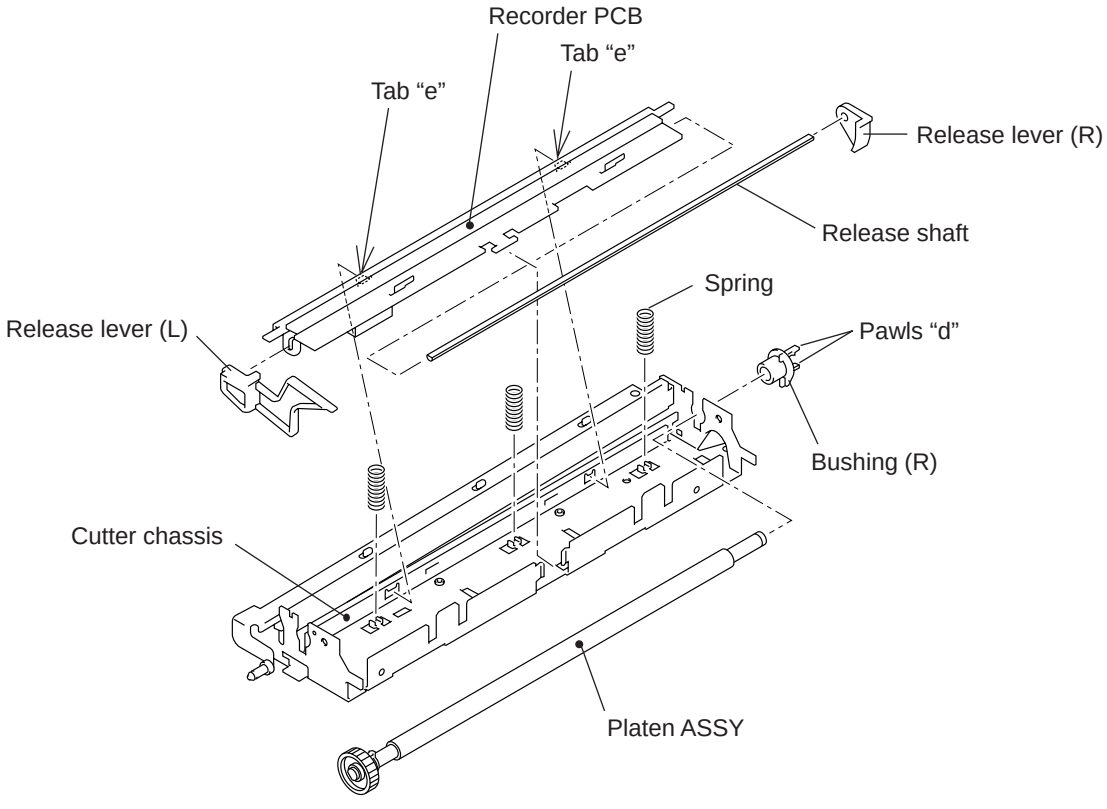
4) Unlock the two latches “b” of the cutter chute from the cutter chassis and pull up the cutter chute.



5) Turn down the left release lever.
6) Slide the left ACS catch towards you while pulling the lock “c” outwards.
   In the same way, remove the right ACS catch.

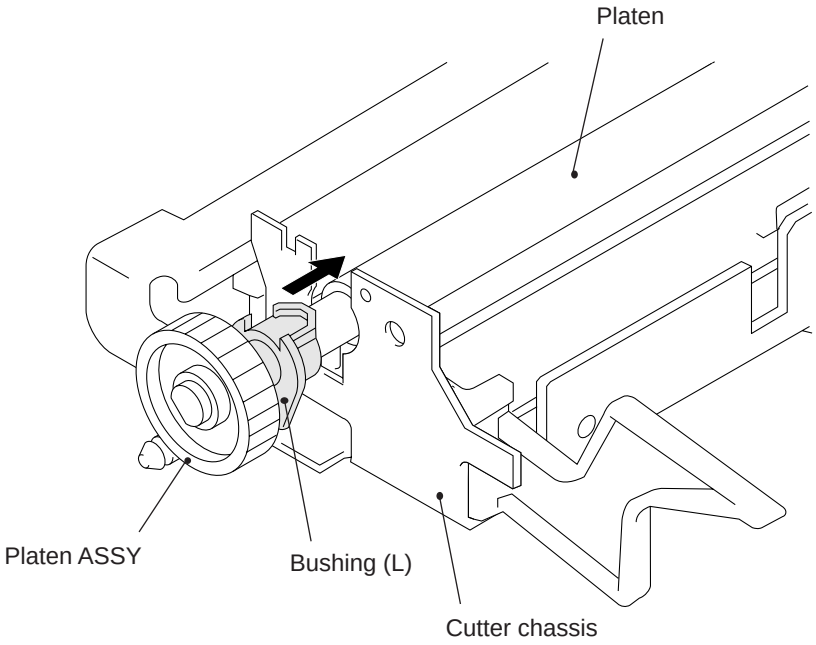


7) Remove the right bushing from the platen ASSY while releasing the two pawls “d.” Then, remove the platen ASSY.
8) Push down the recorder PCB and pull it towards you slightly to release the two tabs “e” from the cutter chassis, taking care not to lose three springs.
9) Remove the right and left release levers from the release shaft.



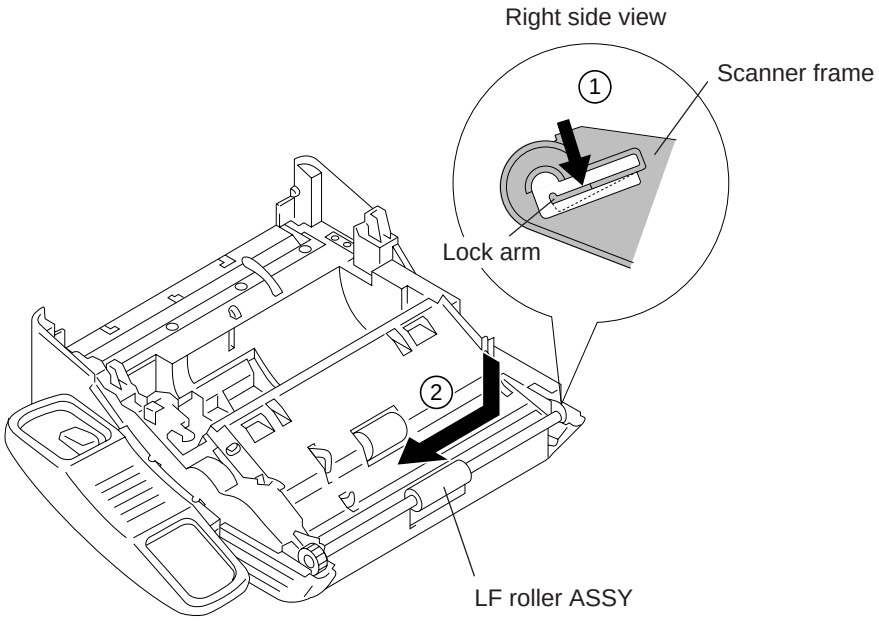
■ **Reassembly of recorder & cutter unit**

- When installing the platen ASSY to the cutter chassis, orient the left bushing as shown below. Then, fit the bushing into the cutter chassis from the left side while pressing down the platen and the recorder PCB.



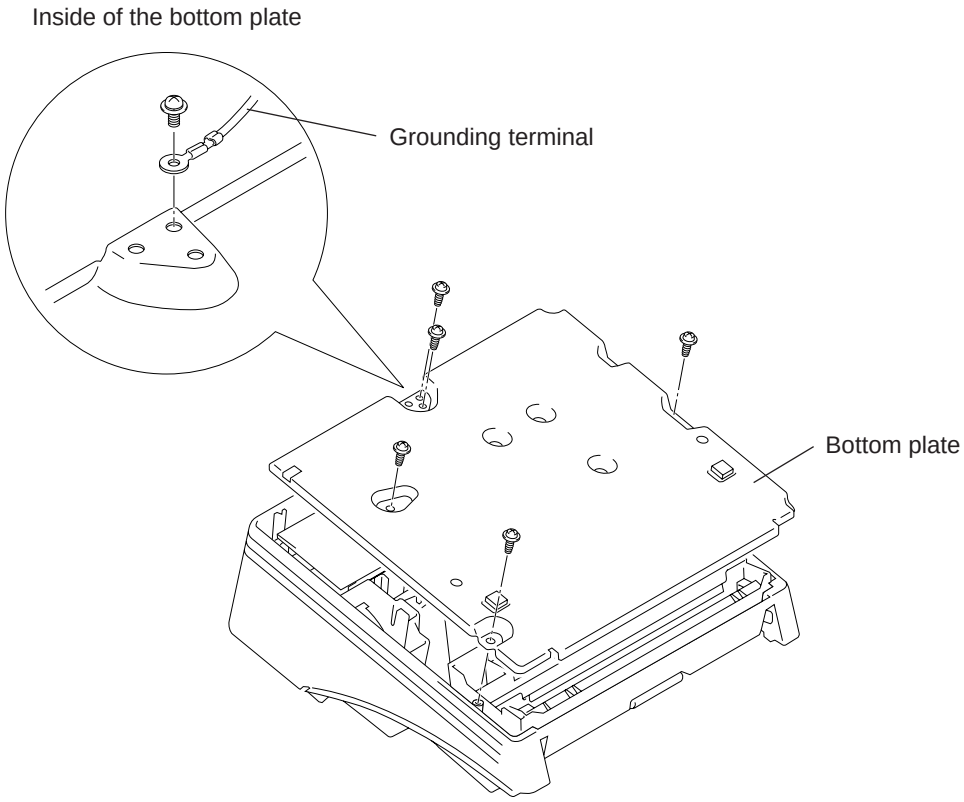
1.6 LF Roller ASSY

(1) Push down the lock arm on the scanner frame ASSY and pull out the LF roller ASSY in the direction of the arrow shown below.



1.7 Bottom Plate

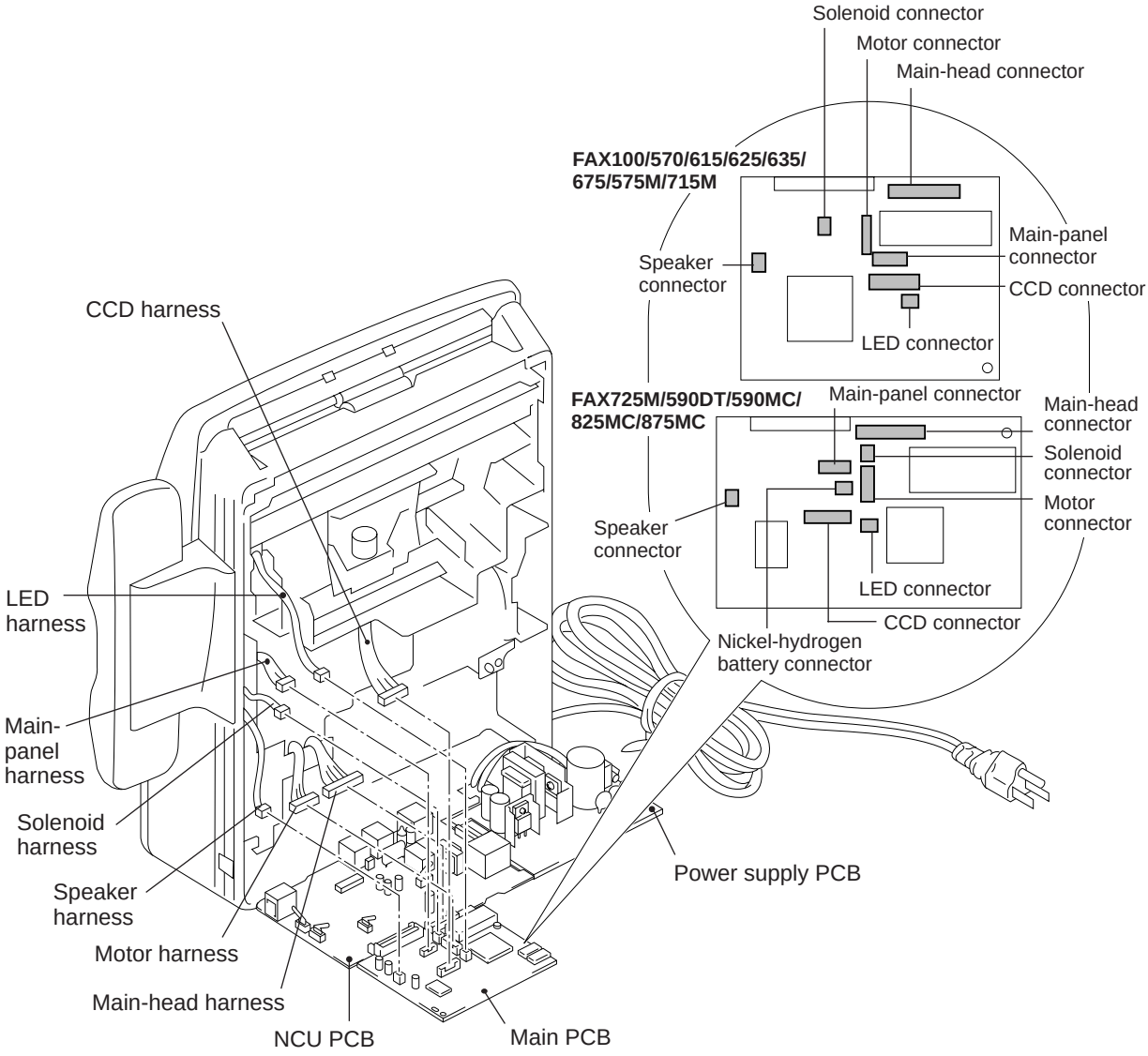
(1) Place the machine upside down.
(2) Remove the five screws.
(3) Remove the bottom plate.



1.8 Main PCB, NCU PCB, and Power Supply PCB

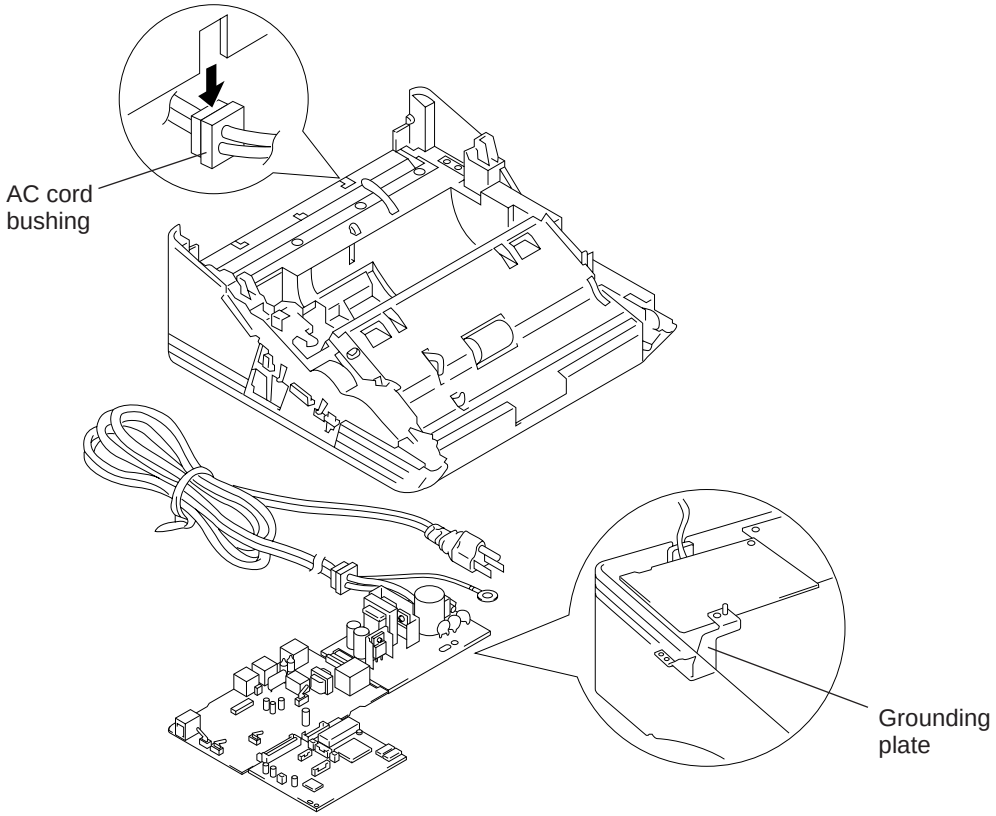
(1) Disconnect the following seven harnesses from the main PCB as shown below:

- Main-head harness (12-pin)
- Main-panel harness (5-pin)
- CCD harness (10-pin)
- Speaker harness (2-pin)
- Motor harness (6-pin)
- Solenoid harness (2-pin)
- LED harness (2-pin)

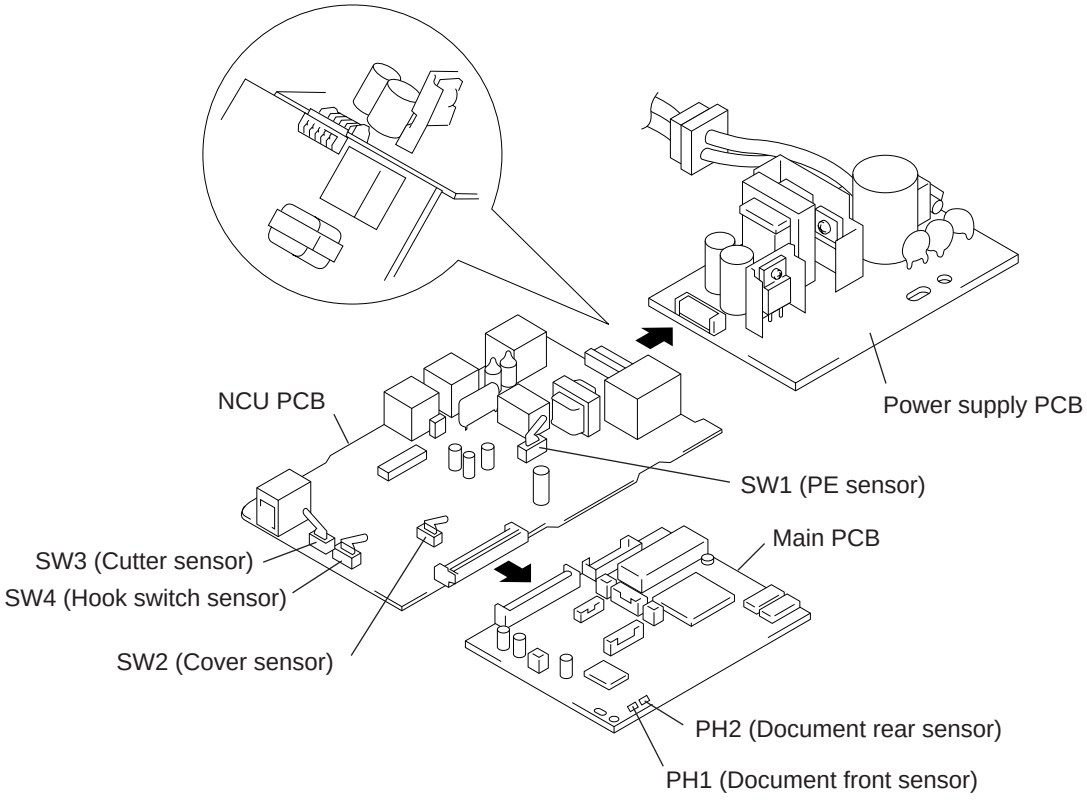


(2) Take off the AC cord bushing from the main frame.

(3) Take out the main PCB, NCU PCB and power supply PCB.



(4) Disconnect the main PCB and power supply PCB from the NCU PCB.



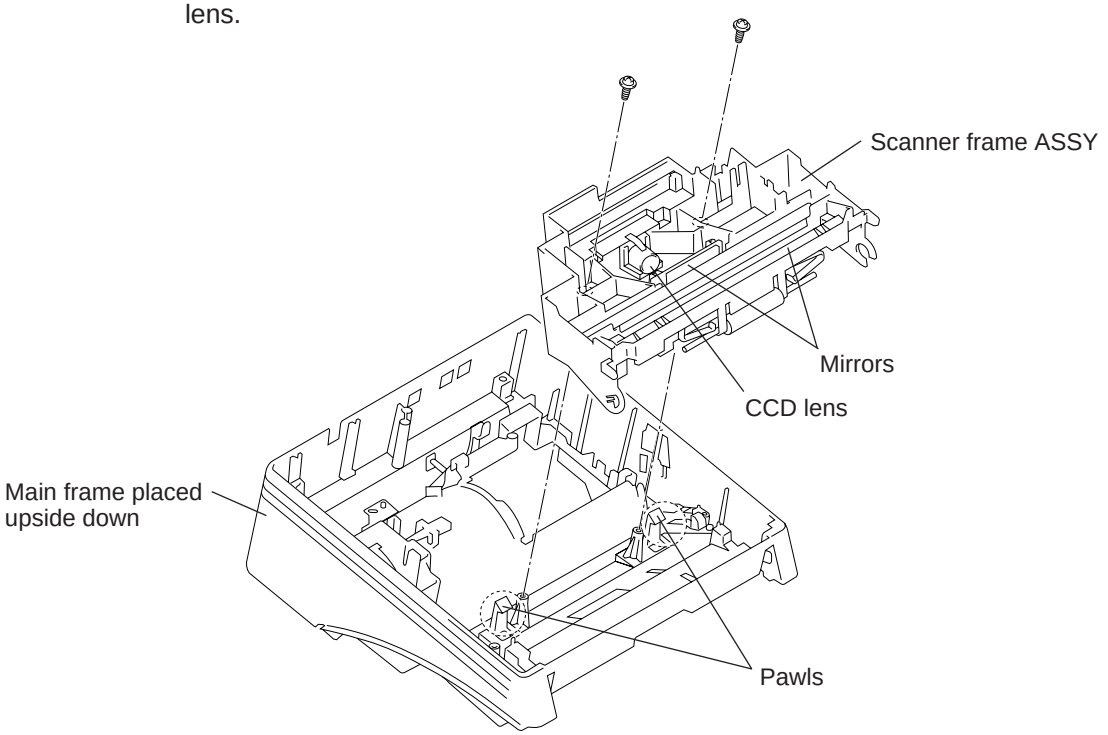
1.9 Scanner Frame ASSY

(1) Remove the two screws.

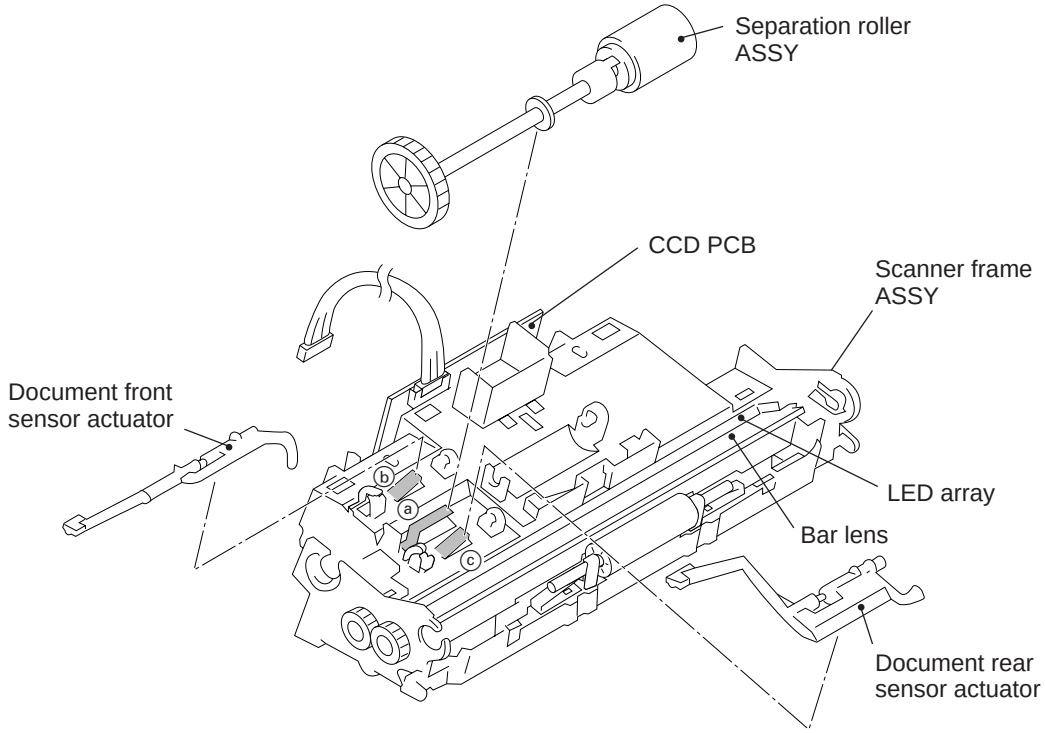
(2) Unhook the scanner frame ASSY from the two pawls provided on the main frame.

(3) Lift up the scanner frame ASSY.

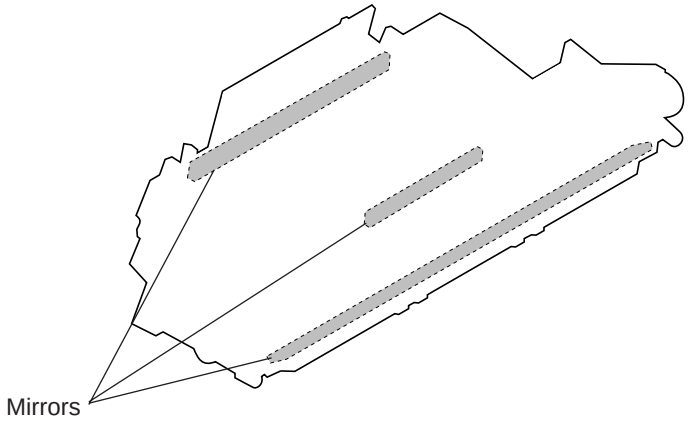
NOTE: Never remove or replace the CCD PCB, CCD lens, mirrors, LED array or bar lens.



(4) To remove the separation roller ASSY, document front and rear sensor actuators, press the ⓐ, ⓑ, and ⓒ locking pawls shown below with the tip of a flat screwdriver, respectively, and move the component to be removed to the left.



NOTE: When accessing these components, take care not to scratch the mirrors, CCD lens, or bar lens.

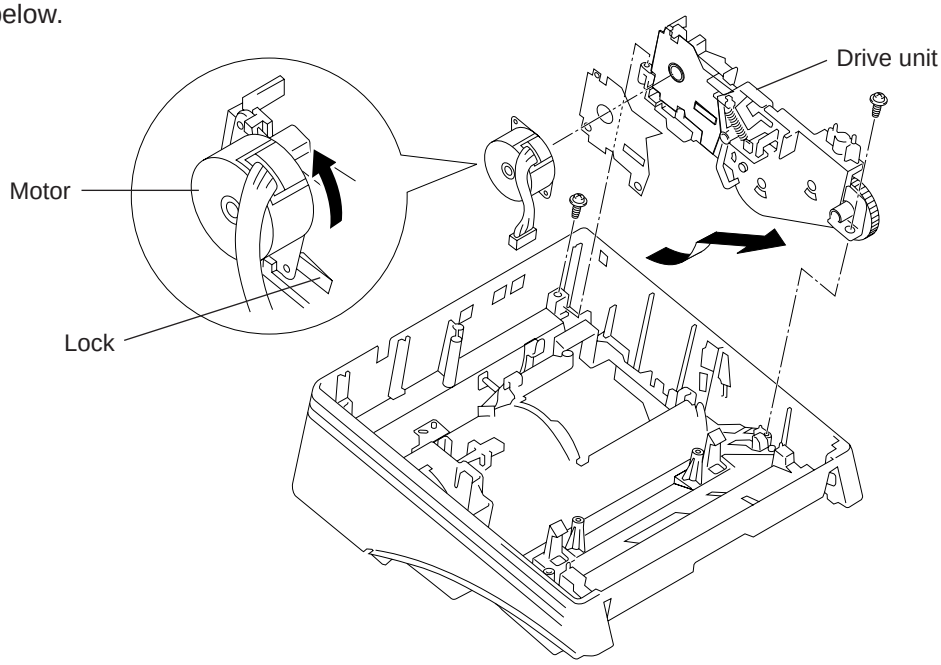


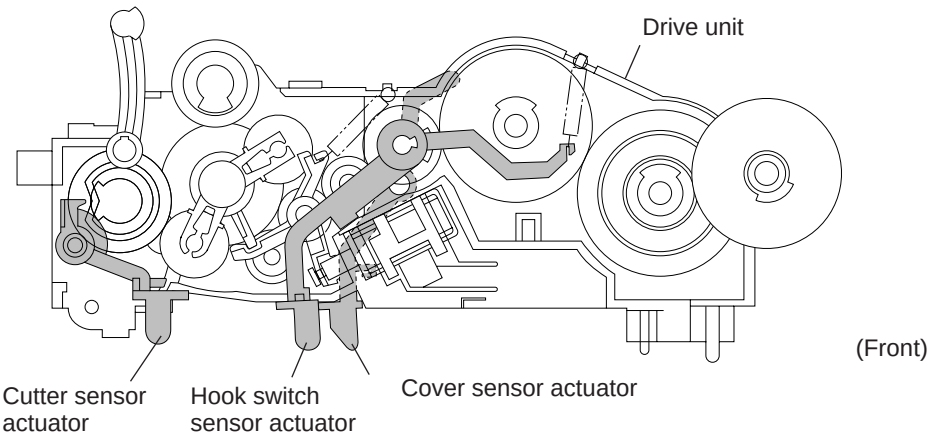
1.10 Drive Unit

(1) Remove the two screws.

(2) Lift up the drive unit.

(3) To remove the motor, press the lock and turn the motor in the direction of the arrow as shown below.

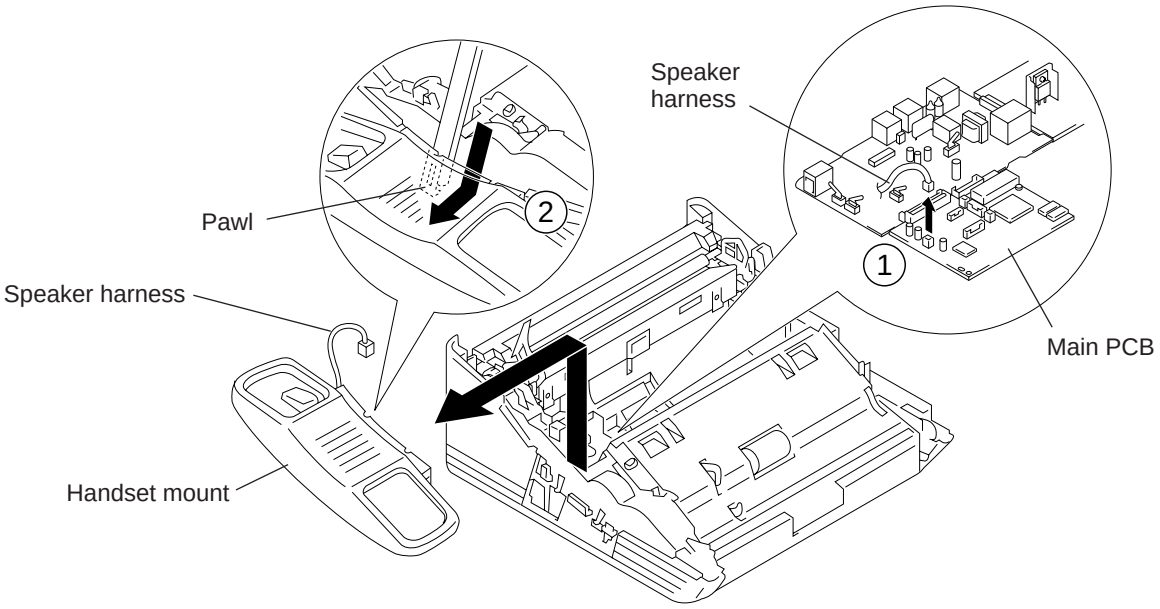




1.11 Handset Mount and Speaker

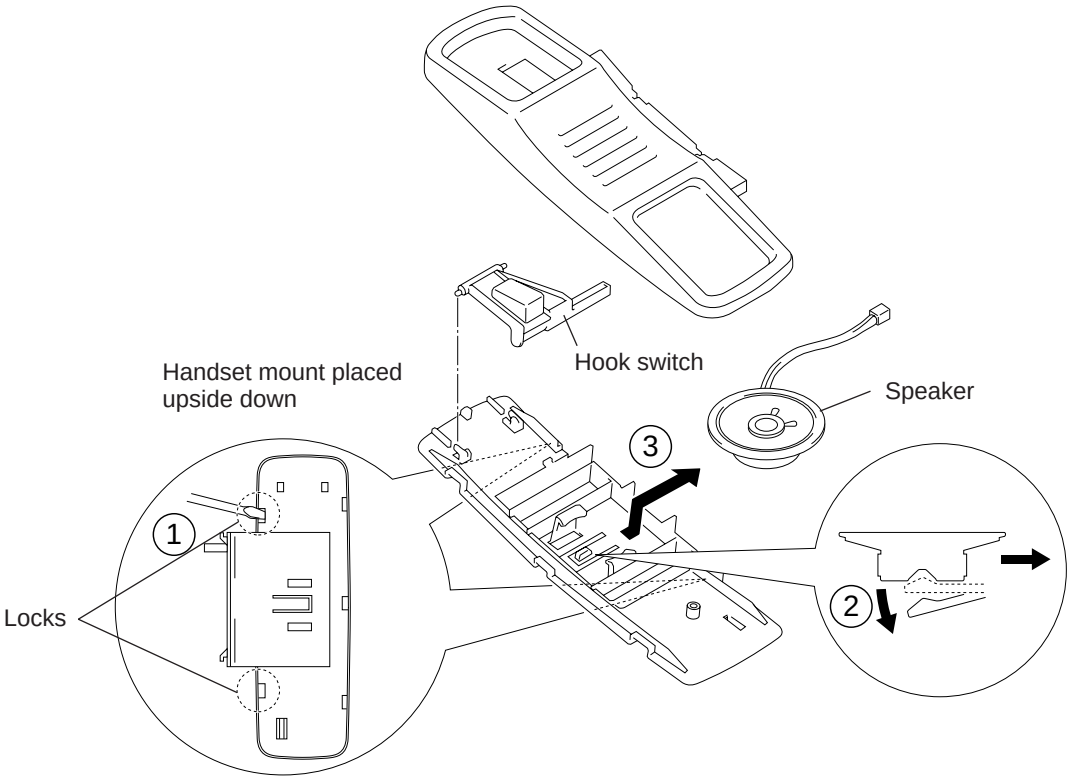
(1) Insert the tip of a 0.5-mm-wide ruler into the slots between the handset mount and the main frame and unhook the handset mount from the pawls provided on the main frame.

(2) Slightly lift up the handset mount slightly and take it off to the left.



(3) To remove the speaker or the hook switch, unhook the locks with a small-blade flat screwdriver to disassemble the handset mount.

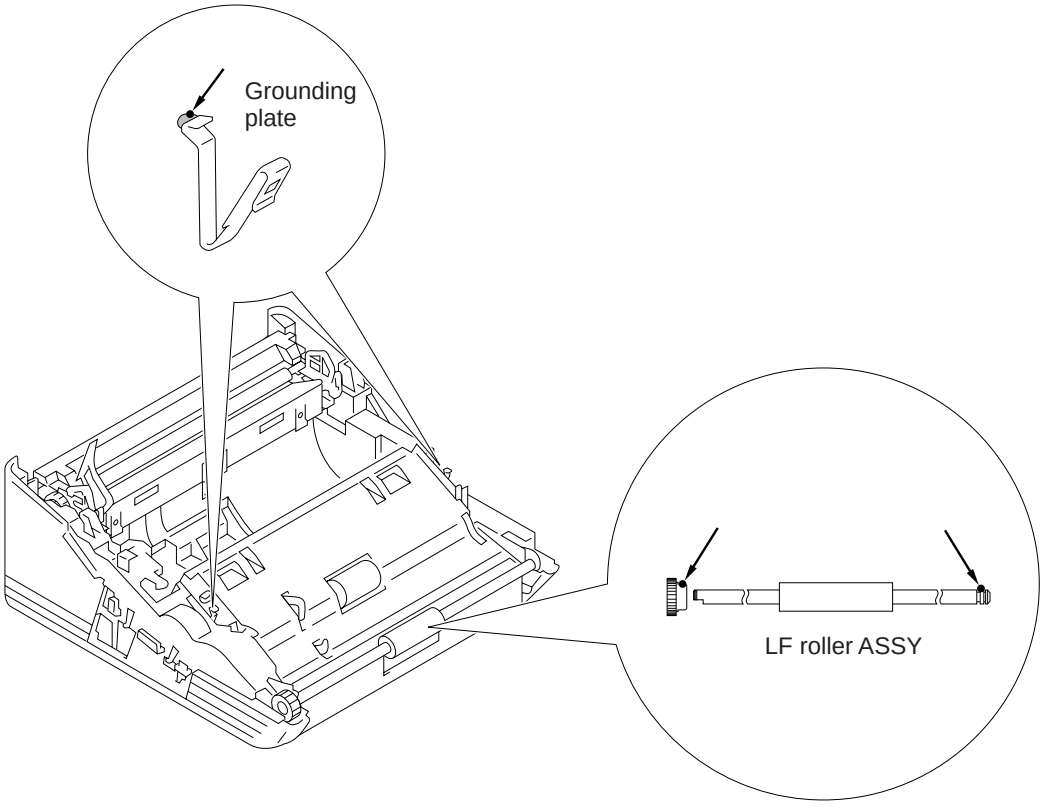
(4) Slide the speaker to the right.



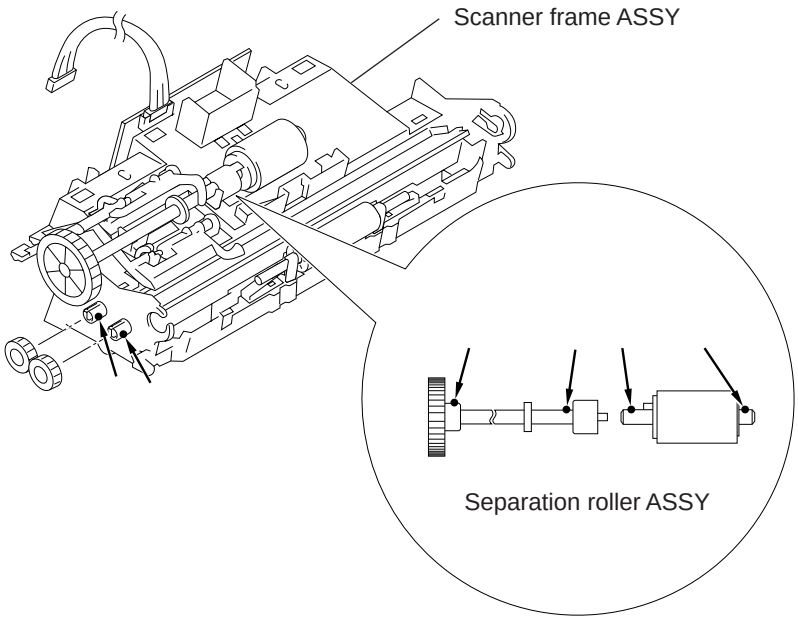
■ Lubrication

Apply two grains of grease (Molicoat EM-30) to each of the following lubrication points:

(1) LF roller ASSY and grounding plates



(2) Separation roller ASSY



2. TROUBLESHOOTING

2.1 Introduction

This chapter gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the facsimile equipment. It is impossible to anticipate all of the possible troubles which may occur in future and determine the troubleshooting procedures, so this chapter covers some sample troubles. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

Prior to proceeding to the troubleshooting, read CHAPTER IV, INDICATION AND INFORMATION PRINTOUT OF ERROR.

2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:

(1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.

(2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.

(3)
- Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body.
- When repairing the PCBs, handle them with extra care.
- When removing the electronic devices with a soldering iron, do not leave solder chips or lead wires inside the machine.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting flowcharts, check that:

(1) Each voltage level on AC input lines and DC lines is correct.

(2) All cables and harnesses are firmly connected.

(3) None of the fuses are blown.

■ Control panel related

Trouble	Action to be taken
(1) LCD shows nothing.	• Check the main-panel harness between the main PCB and the control panel. • Check the interfaces between the main PCB, NCU PCB and power supply PCB. • Check the control panel PCB. • Check the power supply PCB. • Check the main PCB.
(2) Control panel inoperative.	• Check the main-panel harness between the main PCB and the control panel. • Check the interfaces between the main PCB, NCU PCB, and power supply PCB. • Check the control panel PCB. • Check the FPC key. • Check the main PCB.

■ Telephone related

Trouble	Action to be taken
(1) No phone call can be made.	• Check the FPC key. • Check the control panel PCB: - Use the maintenance-mode function No. 13. (Refer to Section 3.) If any defective keys are found, replace them. • Check the NCU PCB. • Check the main PCB.
(2) Speed dialing or one-touch dialing will not work.	• Check whether the ordinary dialing function (other than the speed and one-touch dialing) works correctly or not. - If yes, check the main PCB. - If not, refer to item (1) above.

Trouble	Action to be taken
(3) Speaker silent during on-hook dialing.	• Check whether the ordinary dialing function (other than the on-hook dialing with the hook key) works correctly or not. - If yes, proceed to the following checks: - If not, refer to item (1) above. • Check the speaker. • Check the NCU PCB. • Check the main PCB.
(4) Dial does not switch between tone and pulse.	• Check the main PCB.
(5) Telephone does not ring.	• Check the speaker. • Check the NCU PCB. • Check the main PCB.

■ Communications related

Trouble	Action to be taken
(1) No tone is transmitted.	• Check the main PCB. • Check the NCU PCB.

■ Image related

If the received or sent image has any trouble, first make a copy with the facsimile equipment.

If the copied image is normal, the remote terminal is defective. If it is abnormal, proceed to the troubleshooting list given below:

Trouble	Action to be taken
(1) All white images.	
[At scanning side]	• Check the harnesses between the main PCB and CCD & lens holder ASSY. • Check the main PCB.
[At recording side]	• Check the main-head harness between the main PCB and the recording head. • Check the NCU-head harness between the NCU PCB and the recording head. • Check that the compression springs beneath the recording head are set in place. • Check the main PCB. • Check the recording head.
(2) Image has white vertical streaks.	
[At scanning side]	• Check the CCD & lens holder ASSY.
[At recording side]	• Check the recording head.
(3) All black images.	
[At scanning side]	• Check the interfaces between the main PCB, NCU PCB, and CCD & lens holder ASSY. • Check the LED harness. • Check the LED array. • Check the main PCB.
[At recording side]	• Check the main PCB. • Check the recording head.
(4) Image has black vertical streaks.	
[At scanning side]	• Check the CCD & lens holder ASSY.
[At recording side]	• Check the recording head.

Trouble	Action to be taken
(5) Faint/dark image. [At scanning side]	• Check the LED array. • Check the main PCB.
[At recording side]	• Check that the compression springs beneath the recording head are set in place.
(6) Improper image alignment. [In communications]	• Check the displayed error code. (Refer to Chap. IV.) • Check the connection between the main PCB and the NCU PCB.
[At scanning side]	• Check the interfaces between the main PCB, NCU PCB, and CCD & lens holder ASSY. • Check the main PCB.
[At recording side]	• Check the main-head harness between the main PCB and the recording head. • Check the main PCB.
(7) Stretched-out image or compressed image. [In communications]	• Check the displayed error code. (Refer to Chap. IV.)
[At scanning side]	• Check the separator and its related section. • Check the document feed rollers and their related gears. • Check the solenoid and the planetary gear train. • Check the drive motor and its harness.
[At recording side]	• Check that the compression springs beneath the recording head are set in place. • Check the platen and its gear. • Check the solenoid and the planetary gear train. • Check the drive motor and its harness.

■ Paper feeding related

Trouble	Action to be taken
(1) Neither “COPY: PRESS COPY” nor “FAX: NO. & START” message appears although documents are set.	• Check the document sensors according to the maintenance-mode function No. 32. (Refer to Section 3.)
(2) Document not fed.	• Check the drive motor and its harness. • Check the document feed rollers and their related gears. • Check the main PCB. • Check the solenoid and the planetary gear train. • Check the drive motor and its harness.
(3) Recording paper not fed.	• Check the ADF and its related section. • Check the drive motor and its harness. • Check the recording paper feed rollers and their related gears. • Check the solenoid and the planetary gear train. • Check the main PCB.
(4) The “CUTTER JAM” message cannot be removed.	• Check the drive motor and its harness. • Check the cutter sensor and its position. • Check the cutter gear. • Check the solenoid and the planetary gear train. • Check the main PCB.

3. MAINTENANCE MODE

3.1 Entry into the Maintenance Mode

To make the facsimile equipment enter the maintenance mode, press the FUNCTION, *, 2, 8, 6, and 4 keys in this order.

⟵ Within 2 seconds ⟶

The equipment beeps for approx. 3 seconds and displays "MAINTENANCE" on the LCD, indicating that it is placed in the initial maintenance mode, a mode in which the equipment is ready to accept entry from the keys.

To select one of the maintenance-mode functions listed in the table below, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 3.3.)

NOTES:
- Pressing the 9 key twice in the initial maintenance mode restores the equipment to the standby state.
- Pressing the STOP button after entering only one digit restores the equipment to the initial maintenance mode.
- If an invalid function code is entered, the equipment resumes the initial maintenance mode.

3.2 List of Maintenance-mode Functions

Maintenance-mode Functions (1)

Function Code	Function	Reference Subsection
01	E^2PROM Parameter Initialization	3.3.1
02	————	——
03	————	——
04	————	——
05	Printout of Scanning Compensation Data	3.3.2
06	————	——
07	————	——
08	ADF* Performance Test	3.3.3
09	Test Pattern 1	3.3.4
10	Firmware Switch Setting	3.3.5
11	Printout of Firmware Switch Data	
12	————	——
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	3.3.6
14	————	——
15	————	——
16	Operational Check of Control Panel PCB (Check of LEDs)	3.3.6

* ADF: Automatic document feeder

(Continued on the next page.)

Maintenance-mode Functions (2)

Function Code	Function	Reference Subsection
32	Sensor Operational Check	3.3.7
55	CCD Scanner Area Setting	3.3.8
82	Equipment Error Code Indication	3.3.9
91	E^2PROM Parameter Initialization (except the telephone number storage area)	3.3.1

IMPORTANT

Basically, the maintenance-mode functions listed above should be accessed by service personnel only. However, you may allow end users to access some of these *under the guidance of service personnel* (e.g. by telephone).

The user-accessible functions (codes 10, 11, 82, and 91) are shaded in the above table. Function code 10 accesses the firmware switches WSW01 to WSW34, each of which has eight selectors. You should not allow end users to access all of those selectors, but you may allow them to access user-accessible selectors which are shaded in the firmware switch tables in Subsection 3.3.5.

The service personnel should instruct end users to follow the procedure given below.

(1) Press the FUNCTION key and the MODE key in this order.

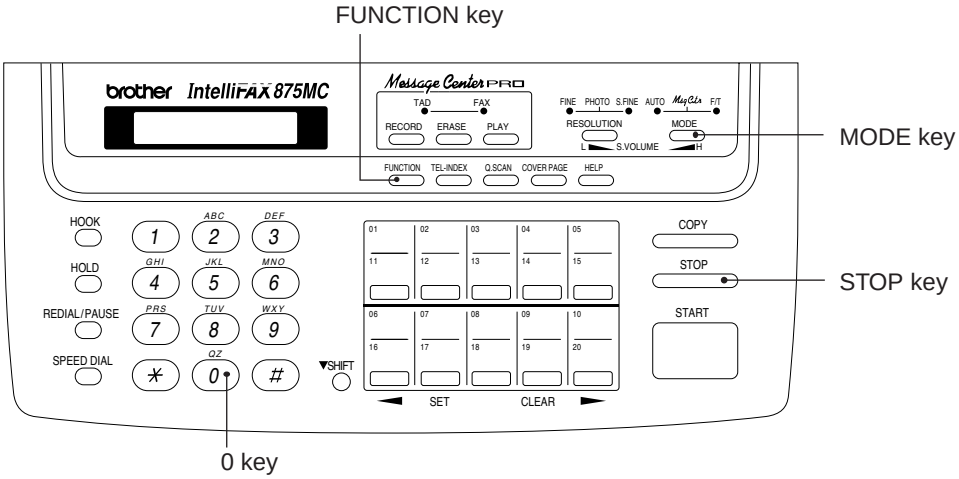
The LCD clears the current display.

NOTE: The MODE key is inoperable during standby for redialing, timer, paging, and forwarding.

(2) Press the 0 key.

(3) Enter the desired function code (10, 11, 82, or 91) with the numerical keys.

For function code 10, access the desired firmware switch according to the operating procedure described in Subsection 3.3.5.



(4) To make the equipment return to the standby state, press the [STOP] key.

- -

3.3 Detailed Description of Maintenance-mode Functions

3.3.1 E^2PROM parameter initialization

■ Function

The equipment initializes the parameters, user switches, and firmware switches registered in the E^2PROM, to the initial values. Entering the function code 01 initializes all of the E^2PROM areas, but entering 91 does not initialize some areas, as listed below.

Data item \ Function code	01	91
Maintenance-mode functions User switches Firmware switches Remote activation code Calendar clock Activity report Distinctive ringing patterns registered (only for USA version) Page memory size	All of these will be initialized.	These will be initialized.
Station ID data Cover page comments Outside line number Telephone function registration One-touch dialing Speed dialing Group dialing		These will <u>not</u> be initialized.

■ Operating Procedure

(1) Press the [0] and [1] keys (or the [9] and [1] keys according to your need) in this order in the initial maintenance mode.

The "PARAMETER INIT" will appear on the LCD.

(2) Upon completion of parameter initialization, the equipment returns to the initial maintenance mode.

3.3.2 Printout of scanning compensation data

■ **Function**

The equipment prints out the white and black level data for scanning compensation.

■ **Operating Procedure**

Do not start this function merely after powering on the equipment but start it after carrying out a sequence of scanning operation. Unless the equipment has carried out any scanning operation, this function cannot print out correct scanning compensation data. This is because the equipment initializes white and black level data and takes in the scanning compensation reference data at the start of scanning operation.

(1) Press the [0] and [5] keys in this order in the initial maintenance mode.
The "WHITE LEVEL 1" will appear on the LCD.

(2) The equipment prints out the scanning compensation data list containing the following:

FAX100/570/615/625

a) 2-value quantized white level data (208 bytes)
b) 2-value quantized black level data (1 byte)
c) 2-value quantized LED light intensity value (1 byte)

Other models

a) 2-value quantized white level data (208 bytes)
b) 2-value quantized black level data (1 byte)
c) Photo-mode white level data (208 bytes)
d) Photo-mode black level data (1 byte)
e) LED light intensity value, 2-value quantized LED light intensity value, and photo-mode LED light intensity
f) 2-value quantized A/D reference value and photo-mode AD reference value

(3) Upon completion of recording of the compensation data list, the equipment returns to the initial maintenance mode.

NOTE: If a certain data is abnormal, that code will be printed in inline style.

```
5F00 : DB DF E4 E7 EB EA ED EE  F0 F0 EF EE EC EC E9 E8
5F10 : E9 E7 E3 E2 E2 E1 E4 E6  EC F0 F3 F2 F1 F3 F1 F4
5F20 : F4 F6 F6 F9 F7 F5 F4 F4  F1 F1 ED E9 EA EB E8 E7
5F30 : E5 E4 E2 E3 E3 E2 EA E8  E7 E9 E6 E9 EC EE EF F2
5F40 : F3 F4 F4 F5 F3 F5 F0 EF  ED E9 E8 E9 E7 E9 E6 E4
5F50 : E5 E6 E5 E3 E5 E3 E3 E7  EA E6 E5 E7 E7 EA EA E7
5F60 : EB EB ED F0 F6 F5 F9 F5  FB F8 FA F9 F9 F3 EF EF
5F70 : EC EB EB EE F0 EE ED ED  EB EC EE F0 EF F1 F1 F2
6F80 : F1 F1 F5 FA F9 FA F7 F9  F8 F8 F6 F2 F4 F3 F2 F0
5F90 : EB EA E5 E7 E4 E4 E2 E0  DE DD DA DD DC DC DE DC
5FA0 : DD DD DD DE DE DE E1 E1  E3 E1 E1 E2 E2 E2 E3 E3
5FB0 : E2 E2 E3 E1 E1 E3 E2 E1  E6 E6 E9 EB E7 EB EE EF
5FC0 : F2 F1 F2 F5 F5 F6 F7 F3  F2 F1 EF EE EF EC EA EC

5F00 : 6F

5F00 : E0 E4 E6 E9 EC ED EF EF  F3 F3 F1 F0 EF EE ED EB
5F10 : EB EA EA E7 E5 E4 E7 E7  F1 F3 F4 F6 F0 F3 F3 F6
5F20 : F3 F5 F6 F6 FA F6 F8 F6  F3 F2 EF EB EE EC EC EA
5F30 : E8 E8 E8 E6 E7 E8 EC E8  EC EC EB EC EC EF F1 F1
5F40 : F4 F3 F4 F3 F3 F4 F0 F0  EF EC EB ED EC EB E9 E9
5F50 : E9 E9 E8 E7 EA E5 E7 E9  ED EA E9 EA E8 ED ED EC
5F60 : ED EC ED F2 F4 F7 F7 F7  FA F9 FA F8 FA F5 F2 ED
5F70 : EF EE ED EF F0 F1 EF EE  EC EE EF F3 F2 F1 F1 F2
5F80 : F3 F4 F6 FA F9 F9 F7 F9  F7 F7 F7 F5 F6 F4 F2 F1
5F90 : ED EA E9 E9 E9 E8 E5 E6  E3 E0 E1 E2 E1 E2 E3 E0
5FA0 : E2 E2 DF E3 E2 E3 E5 E7  E7 E5 E6 E7 E5 E7 E5 E6
5FB0 : E7 E6 E8 E7 E8 E8 E7 E7  E9 EC ED ED EC EE EE F1
5FC0 : F5 F2 F2 F6 F6 F5 F8 F5  F3 F6 F3 EF ED ED ED EC

5F00 : 6F

5F00 : 0E 0F 0F

5F00 : 2E 21
```

Scanning Compensation Data List

3.3.3 ADF performance test

■ Function

The equipment counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD for checking the ADF performance.

■ Operating Procedure

(1) Set documents. (Allowable up to the ADF capacity.)
The "DOC. READY" will appear on the LCD.

(2) Press the [0] and [8] keys in this order.
The equipment
i) copies the 1st document and displays "P.01" on the LCD,
ii) feeds in and out the 2nd through 4th documents while counting without copying them as the LCD shows the corresponding count,
iii) copies the 5th document and displays "P.05" on the LCD,
iv) feeds in and out the 6th through 9th documents while counting without copying them as the LCD shows the corresponding count, and
v) copies the 10th document and displays "P.10" on the LCD.

(3) Upon completion of feeding in and out all of the documents, the final count appears on the LCD.

(4) Press the [STOP] button to return the equipment to the initial maintenance mode.

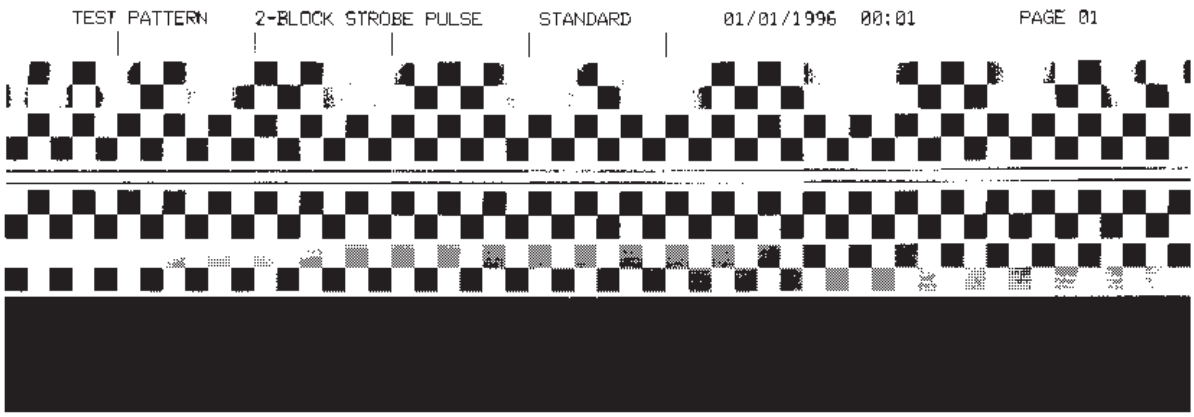
3.3.4 Test pattern 1

■ Function

This function, much like the copying function, prints out test pattern 1 to allow the service personnel to check for record data missing or print quality.

■ Operating Procedure

Press the [0] and [9] keys in this order in the initial maintenance mode.
The figure below shows test pattern 1.



Test Pattern 1

3.3.5 Firmware switch setting and printout

[A] Firmware switch setting

■ **Function**

The facsimile equipment incorporates the following firmware switch functions (WSW01 through WSW34) which may be activated with the procedures using the control panel keys and buttons.

The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW34)

WSW No.	Function
WSW01	Dial pulse setting
WSW02	Tone signal setting
WSW03	PABX mode setting
WSW04	TRANSFER facility setting
WSW05	1st dial tone and busy tone detection
WSW06	PAUSE key setting and 2nd dial tone detection
WSW07	Dial tone setting 1
WSW08	Dial tone setting 2
WSW09	Protocol definition 1
WSW10	Protocol definition 2
WSW11	Busy tone setting
WSW12	Signal detection condition setting
WSW13	Modem setting
WSW14	AUTO ANS facility setting
WSW15	REDIAL facility setting
WSW16	Function setting 1
WSW17	Function setting 2
WSW18	Function setting 3
WSW19	Transmission speed setting
WSW20	Overseas communications mode setting
WSW21	TAD setting 1
WSW22	Copy resolution setting
WSW23	Communications setting
WSW24	TAD setting 2
WSW25	TAD setting 3
WSW26	Function setting 4
WSW27	Function setting 5
WSW28	Function setting 6
WSW29	Function setting 7
WSW30	Function setting 8
WSW31	Function setting 9
WSW32	Function setting 10
WSW33	Function setting 11
WSW34	Function setting 12

■ Operating Procedure

(1) Press the [1] and [0] keys in this order in the initial maintenance mode.

The equipment displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 34).

The following appears on the LCD:

WSWxx 0 0 0 0 0 0 0 0

(3) Use the [←] and [→] keys to move the cursor to the selector position to be modified.

(4) Enter the desired number using the [0] or [1] key.

(5) Press the [SET] button. This operation saves the newly entered selector values onto the E^2PROM and readies the equipment for accepting a firmware switch number.

(6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.

(7) Press the [SET] or [STOP] button to return the equipment to the initial maintenance mode.

NOTES:
- To cancel this operation and return the equipment to the initial maintenance mode during the above procedure, press the [STOP] button.
- If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the equipment will automatically return to the initial maintenance mode.

■ Note

The user-accessible selectors of the firmware switches are shaded in the tables given on the following pages.

■ Detailed Description for the Firmware Switches

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms (for 10 PPS) 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

- **Selectors 1 and 2: Dial pulse generation mode**

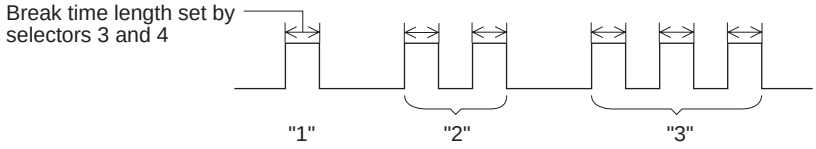
  These selectors set the number of pulses to be generated in pulse dialing.

  N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)
  N + 1: Dialing "N" generates "N + 1" pulses.
  10 - N: Dialing "N" generates "10 - N" pulses.

- **Selectors 3 and 4: Break time length in pulse dialing**

  These selectors set the break time length in pulse dialing.

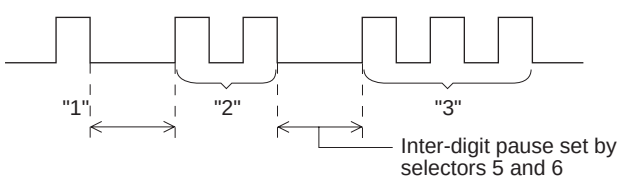
  (Example: If "1", "2", and "3" are dialled when N is set by selectors 1 and 2.)



- **Selectors 5 and 6: Inter-digit pause**

  These selectors set the inter-digit pause in pulse dialing.

  (Example: If "1", "2", and "3" are dialled when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

  This selector determines whether or not the dialing mode may be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

  This selector sets the default dialing mode (pulse dialing or tone dialing) which may be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0", the setting specified by this selector will be also switched automatically.

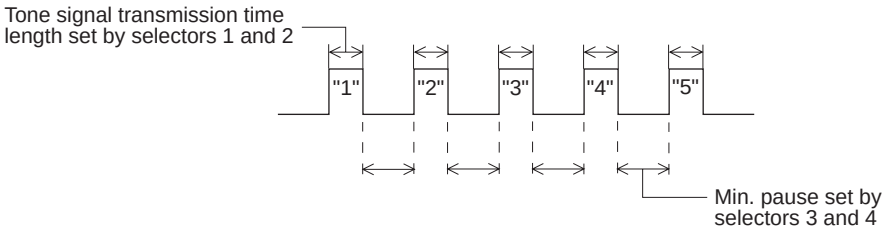
WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 | 8	Attenuator for the beep sound level	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 through 4: Tone signal transmission time length and Min. pause**

  These selectors set the tone signal transmission time length and minimum pause in tone dialing.

  (Example: If "1", "2", "3", "4", and "5" are dialled.)



- **Selectors 5 through 8: Attenuator for the beep sound level**

  These selectors are used to adjust the sound level of beep generated as a ring backtone in the F/T mode or as a signal during remote control operation or at the start of ICM recording.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will be limited if selector 8 of WSW23 is set to "0."

WSW03 (PABX* mode setting)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3 4	Min. detection time length of PABX dial tone, required for starting dialing	No. 2 3 4 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
5	Not used.	
6 7	Dial tone detection in PABX	No. 6 7 0 0 : No detection (3.5 sec. WAIT) 0 1 : No detection (5 sec. WAIT) 1 0 : No detection (7 sec. WAIT) 1 1 : Detection (Frequency only)
8	"R" key function	0: 1st dial tone detection add 1: No 1st dial tone detection

* PABX: Private automatic branch exchange

NOTE: The WSW03 is not applicable in those countries where no PABX is supported, e.g. U.S.A.

- **Selectors 2 through 4: Min. detection time length of PABX dial tone, required for starting dialing**

  Upon detection of the PABX dial tone for the time length set by these selectors, the equipment starts dialing.

  These selectors are applicable only when both selectors 6 and 7 are set to "1" (Detection).

- **Selectors 6 and 7: Dial tone detection in PABX**

  These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX.

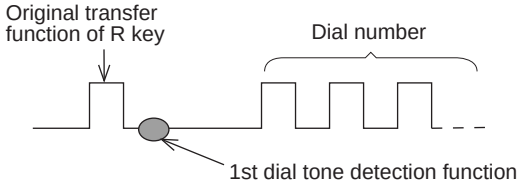
  Setting both of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

- **Selector 8: "R" key function**

  This selector determines whether or not the 1st dial tone detection function (specified by selectors 1 through 3 of WSW05) is added to the R key.

  If this selector is set to "0", pressing the R key automatically activates the 1st dial tone detection function when the PABX and the automatic calling are selected by using the function switch. If you press the R key and a dial number in succession, the equipment will automatically carry out the 1st dial tone detection function following the original transfer function as shown below.



WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility	0: Provide 1: Not provide
2 3	Dual tone detection frequency in ICM recording	No. 2 3 0 0 : 350 + 440 Hz (A) 0 1 : 440 + 480 Hz (B) 1 x : 480 + 620 Hz (C)
4	Tone detection level in ICM recording	0: OFF 1: High
5 6	Earth time length for earth function	No. 5 6 0 0 : 200 ms 0 1 : 300 ms 1 0 : 500 ms 1 1 : 700 ms
7 8	Break time length for flash function	No. 7 8 0 0 : 80 ms 0 1 : 110 ms 1 0 : 250 ms 1 1 : 500 ms

NOTE: The WSW04 is not applicable in those countries where no transfer facility is supported, e.g. U.S.A.

- **Selector 1: Earth function in transfer facility**

  This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

- **Selectors 5 and 6: Earth time length for earth function**

  These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground.

  This setting is effective only when the earth function is selected for the R key by using the function switch.

- **Selectors 7 and 8: Break time length for flash function**

  These selectors set the break time length.

  This setting is effective only when the flash function is selected for the R key by using the function switch.

WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1 2 3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0: 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0: Yes 1: No
8	Not used.	

NOTE: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported, e.g. U.S.A.

- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

  Setting all of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g. in the U.S.A., setting these selectors to "1" makes the equipment start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

  If selector 4 is set to "0" (2 seconds), for instance, a remote ID code whose second digit is detected within 2 seconds after detection of the first digit only will become effective so that the equipment will activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic sending mode.

  Setting selector 6 to "0" ignores a busy tone so that the equipment does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1", respectively, makes the equipment detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the equipment detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic receiving mode

WSW06 (PAUSE key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 2 3	PAUSE key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 0 1 : 17.5 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 1 1 : 2nd dial tone detection both in DP and push-button (PB) dialing systems
4 5 6	Detection of international tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of dial tone detection times	0: Once 1: Twice
8	2nd dial tone interrupt detecting time	0: 30 ms 1: 50 ms

- **Selectors 1 through 3: PAUSE key setting and 2nd dial tone detection**

Selectors
1 2 3

1	2	3	
0	0	0	No WAIT is inserted even if the PAUSE key is pressed.
0	0	1	Pressing the PAUSE key inserts WAIT in pulse dialing, as defined in the above table. If the PAUSE key is pressed repeatedly, the equipment beeps a refusal sound and refuses the entry. In hook-up dialing, however, the equipment allows repeated pressing with an acceptance sound, but inserts WAIT only for the first pressing.
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	Each time the PAUSE key is pressed, the equipment detects a 2nd dial tone. If no 2nd dial tone is inputted within the specified time, the equipment disconnects the line in automatic dialing, or it starts transmitting the dial signal if given after depression of the PAUSE key in hook-up dialing. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 1, 0" or "1, 1, 1" inserts a WAIT of 3.5 seconds.)
1	1	1	

- **Selectors 4 through 6: Detection of international tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the equipment starts dialing.

  This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 1, 1, 0 or 1, 1, 1).

  This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of dial tone detection times**

  This selector sets the number of dial tone detection times required for starting dialing.

- **Selector 8: 2nd dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 2nd tone dialing.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Line current detection	0: No 1: Yes
4 5 6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	1st dial tone interrupt detecting time	0: 30 ms 1: 50 ms
8	Not used.	

NOTE: Selectors 1, 2, and 4 through 7 are not applicable in those countries where no dial tone is supported, e.g. U.S.A.

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for the 1st dial tone and the busy tone (before dialing) to be detected.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1, 1, 1."

- **Selector 3: Line current detection**

  This selector determines whether or not the equipment should detect a line current before starting dialing.

- **Selectors 4 through 6: 2nd dial tone detection level**

  These selectors set the detection level of the 2nd dial tone.

- **Selector 7: 1st dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 1st dial tone dialing.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 2 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 7 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

- **Selectors 1 through 3: 1st dial tone detection time length**

  Upon detection of the 1st dial tone for the time length set by these selectors, the equipment starts dialing.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1, 1, 1."

- **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

  These selectors set the time-out length for the 1st and 2nd dial tone detection so that the equipment waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets : 64 octets
2	Not used.	
3 | 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Elapsed time for time-out control for no response from the called station in automatic sending mode	No. 7 8 0 0 : 50 sec. 0 1 : 70 sec. 1 0 : 90 sec. 1 1 : 35 sec.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the facsimile equipment can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the equipment divides a message into frames for transmission so that if any data error occurs on the transmission line, the equipment retransmits only those frames containing the error data.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 6: T1 time**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Elapsed time for time-out control**

  If the equipment receives no response (no G3 command) from the called terminal in automatic sending during the time set by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function	Setting and Specifications
1	Switching of DPS, following the CML ON/OFF	0: No 1: Yes
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries	No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7	Not used.	
8	Not used.	

- **Selector 1: Switching of DPS, following the CML ON/OFF**

  Setting this selector to "1" switches DPS automatically following the CML ON/OFF operation. This function is provided to conform to the Swedish standard.

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

  This selector sets the time length from when the equipment transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

  This selector sets the time length until the equipment transmits a CNG after it turns ON the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

  This selector sets the time length until the equipment transmits a CED after it turns ON the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

  These selectors set the number of training retries to be repeated before automatic fallback.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 x : Widens by 10 Hz
3	Not used.	
4	ON/OFF time length ranges (More than one setting allowed)	1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 700-800/700-800 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

NOTE: The WSW11 is not applicable in those countries where no busy tone detection is supported, e.g. U.S.A.

The setting of WSW11 is effective only when selectors 5 and 6 of WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

- **Selectors 1 and 2: Frequency band range**

  These selectors set the frequency band for busy tone to be detected.

- **Selectors 4 through 8: ON/OFF time length ranges**

  These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1", the ranges become wider. For example, if selectors 4 and 5 are set to "1", the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications
1 2	Min. OFF time length of calling signal (Ci)	No. 1 2 0 0 : 300 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. OFF time length of calling signal (Ci)	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Detecting time setting	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7	Delay	0: Yes 1: No
8	Not used.	

* 1000 ms in Chinese or Hong Kong versions.

- **Selectors 1 through 4: Min. and max. OFF time length of calling signal (Ci)**

  If the equipment detects the OFF state of calling signal (Ci) for the time length which is above the value set by selectors 1 and 2 and less the value set by selectors 3 and 4, it interprets the Ci signal as OFF.

- **Selectors 5 and 6: Detecting time setting**

  These selectors set the time length required to make the equipment acknowledge itself to be called. That is, if the equipment continuously detects calling signals with the frequency set by selectors 1 through 4 of WSW14 during the time length set by these selectors 5 and 6, it acknowledges the call.

- **Selector 7: Delay**

  Setting this selector to "0" allows the equipment to insert a 900 ms WAIT after acknowledgement of the call until the equipment turns on the CML relay to start receiving operation.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level (Z = 600 Ω)	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

  Set these selectors according to the distance from the telephone switchboard to the facsimile equipment.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will be limited if selector 8 of WSW23 is set to "0".

WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (Lower limit)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (Upper limit)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 70 Hz
5 6 7 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4: Frequency band selection**

  These selectors are used to select the frequency band of calling signals for activating the AUTO ANS facility.

- **Selectors 5 through 8: No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Selection of redial interval	No. 1 2 0 0 : 5 minutes 0 1 : 1 minutes 1 0 : 2 minutes 1 1 : 3 minutes
3 4 5 6	No. of redialings	No. 3 4 5 6 0 0 0 0 : 16 times 0 0 0 1 : 1 time 0 0 1 0 : 2 times 0 0 1 1 : 3 times | | 1 1 1 1 : 15 times
7 | 8	Not used.	

- **Selectors 1 through 6: Selection of redial interval and No. of redialings**

  The equipment redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

  This setting is effective only when selector 7 is set to "0."

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications	
1	Automatic cutter	0: ON	1: OFF
2	CCITT superfine recommendation	0: OFF	1: ON
3	Remote reception	0: Only from the connected external telephone	1: From all telephones connected
4 | 5	Not used.		
6	Exclusive line mode	0: OFF	1: ON
7	Max. document length limitation	0: 400 cm	1: 90 cm
8	Communications list output	0: No	1: Yes

- **Selector 1: Automatic cutter**

  The selector activates or deactivates the automatic cutter.

- **Selector 2: CCITT superfine recommendation**

  If this selector is set to "1", the equipment communicates in CCITT recommended superfine mode (15.4 lines/mm). If it is set to "0", it communicates in native superfine mode.

- **Selector 3: Remote reception**

  Setting this selector to "0" allows the facsimile equipment to receive data from the directly connected external telephone only. Setting it to "1" allows the equipment to receive data from all telephones connected in parallel as well as the directly connected external one.

  If any of the following troubles occurs frequently, set this selector to "0".

  - Dialing from any of the telephones connected in parallel to the outside line starts the facsimile equipment.
  - Picking up any handset of the telephones connected in parallel while the facsimile equipment is in receiving operation disarranges the received image due to the superimposed noise.

- **Selector 6: Exclusive line mode**

  Setting this selector to "1" connects the equipment to the exclusive line, which enables transmission just by pressing the START button without dialing operation at both the calling and called terminals.

- **Selector 7: Max. document length limitation**

  This selector is used to select the maximum length of a document to be sent.

- **Selector 8: Communications list output**

  Setting this selector to "1" prints a communications list for every transmission. This selector should be set to "1" for error analysis only and set to "0" during ordinary use by the end user.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 X : Valid except when 'call reservation' is selected.
3	Power failure report output	0: ON 1: OFF
4	Clock/prompt alternate indication on the LCD	0: OFF 1: ON
5	Calendar clock type	0: USA type 1: European type
6	Error indication in activity report	0: NO 1: YES
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

- **Selectors 1 and 2: Off-hook alarm**

  These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off.

- **Selector 3: Power failure report output**

  This selector determines whether or not the equipment outputs a power failure report when the power is turned on.

- **Selector 4: Clock/prompt alternate indication on the LCD**

  If this selector is set to "1", the calendar clock and the prompt "INSERT DOCUMENT" appear alternately on the LCD while the equipment is on standby; if it is set to "0", only the calendar clock appears.

- **Selector 5: Calendar clock type**

  If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (European), the DD/MM/YY hh:mm format applies. Where, DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 6: Error indication in activity report**

  This selector determines whether or not a communications error code will be printed in the activity report.

- **Selector 7: Non-ring reception**

  Setting this selector to "1" makes the equipment receive calls without ringer sound if the ring delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	CCD manufacturer setting	Fixed to 1.
2 3	Not used.	
4	ACS* check sheet output function on/off key	0: Operative 1: Inoperative
5	ACS* check sheet output function	0: ON 1: OFF
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 X : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

* ACS: Anti-curl system

- **Selector 1: CCD manufacturer setting**

  Reserved for future variation of CCD.

- **Selector 4: ACS check sheet output function on/off key**

  If this selector is set to “0” (Operative), the user can toggle the ACS check sheet output function on and off by pressing the right and left arrow keys simultaneously. If it is set to “1” (Inoperative), the user cannot toggle the ACS check sheet output function from the control panel so that the setting specified by selector 5 becomes effective.

- **Selector 5: ACS check sheet output function**

  When selector 4 is set to “0”, the setting specified by this selector becomes the default state of the ACS check sheet output function. When selector 4 is set to “1”, the setting specified by this selector becomes permanently effective.

- **Selector 6: Registration of station ID**

  Setting this selector to "0" permits the registration of station ID for Austrian and Czecho versions.

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors sets monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1 2 3	First transmission speed choice for fallback	No. 1 2 3 No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps 0 1 1 : 9,600 bps 1 0 0 : 12,000 bps 1 0 1 : 1 1 0 : 14,400 bps * 1 1 1 :
4 5 6	Last transmission speed choice for fallback	
7 8	Not used.	

* 9,600 bps for the FAX100/570/615/625/635/675/575M/715M

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

  These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the equipment attempts to synchronize the data transmission via the MODEM. If the synchronization fails, the equipment automatically steps down to the next lowest speed and attempts to synchronize the data transmission again. The equipment repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

  If the MODEM always falls back to a low transmission speed (e.g. 4,800 bps), set the first transmission speed choice to the lower one (e.g. modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

  Generally, to save the transmission time, set the last transmission speed choice to a higher one.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	Chattering elimination for CNG detection	No. 6 7 0 0 : During CNG ON and OFF 0 1 : During CNG OFF only 1 X : No elimination
8	Not used.	

* EP: Echo protection

- **Selector 1: EP tone prefix**

  Setting this selector to "1" makes the equipment transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

  Prefixing an EP tone is effective when the equipment fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.

- **Selectors 2 and 3: Overseas communications mode**

  These selectors should be used if the facsimile equipment malfunctions in overseas communications. According to the communications error state, select the signal specifications.

  Setting selector 2 to "1" allows the equipment to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

  Setting selector 3 to "1" allows the equipment to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals have little potential for data distortion due to echoes. Note that some called models may cause error by receiving a self-outputted DIS.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 5	Max. waiting time for voice signal	No. 1 2 3 4 5 0 0 0 0 0 : No detection 0 0 0 0 1 : 1 sec. 0 0 0 1 0 : 2 sec. 0 0 0 1 1 : 3 sec. | | 0 1 0 0 0 : 8 sec. | | 1 1 1 1 1 : 31 sec.
6 7	Two-way recording	No. 6 7 0 0 : A (for U.S.A.) 0 1 : B (for Europe) 1 0 : C (without beep) 1 1 : D (OFF)
8	Erasion of message stored in the memory after the message transfer	0: YES 1: NO

- **Selectors 1 through 5: Max. waiting time for voice signal**

  In the TAD mode, the equipment waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

  If the external TAD is connected to the equipment, the total length of the maximum waiting time specified by these selectors and the delay time specified by WSW25 (selectors 1 and 2) should not exceed 40 seconds.

- **Selectors 6 and 7: Two-way recording (For those models equipped with a built-in TAD)**

  These selectors select the specifications of the two-way recording feature.

- **Selector 8: Erasion of message (For those models equipped with a built-in TAD)**

  Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (Copy resolution setting)

Selector No.	Function	Setting and Specifications
1 | 3	Not used.	
4	Copy resolution	0: Fine 1: Superfine
5 | 8	Not used.	

- **Selector 4: Copy resolution**

  This selector determines whether the resolution for multi-copy should be Fine or Superfine.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6 7	Not used.	
8	Limitation of attenuation level	0: YES 1: NO

- **Selector 1: Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0", the called station starts counting zeros after 100 ms from the head of a series of zeros detected.

  If it is set to "1", the called station starts counting zeros upon detection of 10-ms successive zeros after 50 ms from the head of a series of zeros detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3: Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5: Decoding error rate for transmission of RTN**

  The facsimile equipment checks the actual decoding errors, and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 8: Limitation of attenuation level**

  Setting this selector to "0" limits the attenuation level for the beeper and modem up to 10 dB.

  This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Maximum OGM recording time	No. 1 2 0 0 : 15 sec. 0 1 : 20 sec. 1 0 : 30 sec. 1 1 : 50 sec.
3 4	Time length from CML ON to start of pseud ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 | 8	Attenuator for playback of ICM/ OGM to the line (Selectable from the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 and 2: Maximum OGM recording time (For those models equipped with a built-in TAD)**

  These selectors set the allowable maximum recording time for an OGM.

- **Selectors 3 and 4: Time length from CML ON to start of pseud ring backtone transmission**

  These selectors set the time length after CML becomes ON until the start of pseud ring backtone transmission.

  In those versions which have an OGM facility instead of pseud ring backtone, these selectors set the time length after CML becomes ON until the start of OGM transmission.

- **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line (For those models equipped with a built-in TAD)**

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  This setting will not be limited by selector 8 of WSW23.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 | 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 seconds 0 0 1 : 4 seconds 0 1 0 : 0 1 1 : 1 0 0 : 1 0 1 : 1 1 0 : 1 1 1 : 16 seconds
8	Automatic shift to facsimile message receive mode in ICM recording mode	0: YES 1: NO

- **Selectors 5 and 7: Pause between paging number and PIN (For those models equipped with a built-in TAD)**

  These selectors set the pause time between paging telephone number and PIN (private identification number) for the paging feature.

- **Selector 8: Automatic shift to facsimile message receive mode in ICM recording mode (For those models equipped with a built-in TAD)**

  If this selector is set to "0", the equipment automatically shifts to the facsimile message receive mode after recording an ICM. If it is set to "1", the equipment automatically disconnects the line after the waiting time has passed.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 | 3	Not used.	
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)	No. 4 5 0 0 : No detection (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

- **Selectors 4 and 5: No. of CNG cycles to be detected**

  The equipment interprets CNG as an effective signal if it detects CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode.

- **Selectors 6 and 7: No. of CNG cycles to be detected (For the FAX100/570/615/625/635/675/575M/715M)**

  The equipment interprets CNG as an effective signal if it detects CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T mode.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: YES 1: NO
3	Automatic playback of OGM at the start time of OGM ON mode	0: NO 1: YES
4	Detection of distinctive ringing pattern	0: NO 1: YES
5	Automatic erasion of voice alarm	0: YES 1: NO
6	Recording quality level	0: High 1: Normal
7	Sampling rate when the recording quality level is set to High	0: Short 1: Long
8	Not used.	

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM at the start time of OGM ON mode (For those models equipped with a built-in TAD)**

  This selector determines whether or not the equipment automatically plays back an OGM the moment it switches to the OGM ON mode in the MC mode.

- **Selector 4: Detection of distinctive ringing pattern**

  If this selector is set to "0", the equipment detects only the number of rings; if it is set to "1", the equipment detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 5: Automatic erasion of voice alarm**

  This selector determines whether or not the voice alarm should be erased from the memory after it is issued.

- **Selector 6: Recording quality level (For those models equipped with a built-in TAD)**

  This selector determines the recording quality level (this function can be accessed also by the user function 8-8). If it is set to “0” (High), the sampling rate by selector 7 of WSW27 takes effect; if it is set to “1” (Normal), the sampling rate specified by selector 4 of WSW30 takes effect.

- **Selector 7: Sampling rate when the recording quality level is set to Normal (For those models equipped with a built-in TAD)**

  This selector determines the sampling rate when selector 6 of WSW27 is set to “1” (High). If this selector is set to “0”, the sampling rate is 9.6 kbps; if it is set to “1”, the sampling rate is 8.8 kbps.

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 2 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : –1 dB 1 1 0 : –2 dB 1 1 1 : –3 dB
4 5 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : –1 dB 1 1 0 : –2 dB 1 1 1 : –3 dB
7 8	Not used.	

- **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

  These selectors are intended for the manufacturer who tests the equipment for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 2 3	Compression threshold level for voice signals inputted via the network in the built-in TAD operation	No. 1 2 3 0 0 0 : -47.0 dBm (A) 0 0 1 : -48.5 dBm (B) 0 1 0 : -50.0 dBm (C) 0 1 1 : -51.5 dBm (D) 1 0 0 : -53.0 dBm (E) 1 0 1 : -54.5 dBm (F) 1 1 0 : -56.0 dBm (G) 1 1 1 : OFF (H)
4 5 6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4 5 6 0 0 0 : -44.0 dBm (A) 0 0 1 : -45.0 dBm (B) 0 1 0 : -47.0 dBm (C) 0 1 1 : -48.5 dBm (D) 1 0 0 : -50.0 dBm (E) 1 0 1 : -51.5 dBm (F) 1 1 0 : -53.0 dBm (G) 1 1 1 : OFF (H)
7	Automatic dialing by caller IDs stored in the memory	0: Yes 1: No
8	Beep at the time of full activity report data	0: No 1: Yes

- **Selectors 1 through 6: Compression threshold level for signals inputted via the network/ handset in the built-in TAD operation (For those models equipped with a built-in TAD)**

  If voice signals inputted via the network or handset are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

- **Selector 7: Automatic dialing by caller IDs stored in the memory**

  This selector determines whether or not the automatic dialing function by caller IDs stored in the memory (see the Note below) can be accessed.

  If it is set to "0", caller IDs stored in the memory can be called up on the LCD by the user function 6-7 and then pressing the START button when the desired caller ID is displayed dials the caller automatically.

  (Note: The equipment can store a maximum of the latest 30 incoming caller IDs together with the reception date and time in the memory.)

- **Selector 8: Beep at the time of full activity report data**

  If this selector is set to “1,” the equipment will beep at the time of full activity report data (as well as displaying a message on the LCD, prompting the output of the activity report).

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 2 3	Detection level of dial tone or busy tone for the built-in TAD operation	No. 1 2 3 0 0 0 : -38.0 dBm (A) 0 0 1 : -39.5 dBm (B) 0 1 0 : -41.0 dBm (C) 0 1 1 : -42.5 dBm (D) 1 0 0 : -44.0 dBm (E) 1 0 1 : -45.5 dBm (F) 1 1 0 : -47.0 dBm (G) 1 1 1 : -48.5 dBm (H)
4	Sampling rate when the recording quality level is set to Normal	0: Short 1: Long
5	Speaker output level	0: Higher 1: Lower
6 | 8	Not used.	

- **Selectors 1 through 3: Detection level of dial tone or busy tone for built-in TAD operation (For those models equipped with a built-in TAD)**

  If dial tone or busy tone inputted during ICM recording is below the level specified by these selectors, the TAD stops recording and disconnects the line.

- **Selector 4: Sampling rate when the recording level is set to Normal (For those models equipped with a built-in TAD)**

  This selector determines the sampling rate when selector 6 of WSW27 is set to "0" (Normal). If this selector is set to "0", the sampling rate is 8.8 kbps; if it is set to "1", the sampling rate is 8.0 kbps.

- **Selector 5: Speaker output level (For those models equipped with a built-in TAD)**

  This selector determines the speaker output level when the speaker volume switch is set to HIGH or LOW, as listed below.

Selector 5 of WSW30 / Speaker Volume Switch Position	0 (Higher)	1 (Lower)
HIGH	High	Medium-High
LOW	Medium-Low	Low

WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms 1: 90 ms
6 | 8	Not used.	

- **Selector 5: Minimum short-OFF duration in distinctive ringing**

  The ringer pattern consists of short and long rings, e.g. short-short-long rings. This selector sets the minimum OFF duration following a short ring in order to avoid missing ringer tones in distinctive ringing.

  If this selector is set to “1”, when the short-OFF duration is a minimum of 90 ms long, then the equipment will interpret the short-OFF as OFF.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 6	Default resolution	No. 5 6 0 0 : Standard 0 1 : Fine 1 0 : Super fine 1 1 : Photo
7 8	Default contrast	No. 7 8 0 0 : 0 1 : } Automatic 1 0 : Super light 1 1 : Super dark

- **Selectors 5 and 6: Default resolution**

  When the equipment is powered up or completes a transaction, the resolution returns to the default value specified by these selectors.

- **Selectors 7 and 8: Default contrast**

  When the equipment is powered up or completes a transaction, the contrast returns to the default value specified by these selectors.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 2 3	Detection threshold level for voice signals inputted via the network in the built-in TAD operation	No. 1 2 3 0 0 0 : -42.5 dBm (A) 0 0 1 : -44.0 dBm (B) 0 1 0 : -45.5 dBm (C) 0 1 1 : -47.0 dBm (D) 1 0 0 : -48.5 dBm (E) 1 0 1 : -50.0 dBm (F) 1 1 0 : -51.5 dBm (G) 1 1 1 : -53.0 dBm (H)
4 5	First communications speed choice for PCI	No. 4 5 0 0 : 14,400 bps 0 1 : 12,000 bps 1 0 : 9,600 bps 1 1 : 7,200 bps
6	Report output of polled transmission requests	0: YES 1: NO
7 8	Comfortable noise level	No. 7 8 0 0 : OFF 0 1 : Low (A) 1 0 : Medium (B) 1 1 : High (C)

The WSW33 is applicable to those models equipped with a built-in TAD.

- **Selectors 4 and 5: First communications speed choice for PCI**

  These selectors are used to set the first communications speed choice with which the equipment attempts to synchronize the data transmission via the PC interface. If the synchronization fails, the equipment automatically steps down to the next lowest speed.

- **Selector 6: Report output of polled transmission requests**

  This function does not apply in the U.S.A. version.

- **Selectors 7 and 8: Comfortable noise level**

  These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression.

  If they are set to "0, 0", no noise will be added.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 2 3	ICM recording time to be erased preceding the tone detection when the equipment automatically disconnects the line because no voice signal has been received	No. 1 2 3 0 0 0 : 0 second 0 0 1 : 1 second 0 1 0 : 2 seconds 0 1 1 : 3 seconds 1 0 0 : 4 seconds 1 0 1 : 5 seconds 1 1 0 : 6 seconds 1 1 1 : 7 seconds
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T or TAD mode)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

- **Selectors 1 through 3: ICM recording time to be erased preceding the tone detection (For those models equipped with a built-in TAD)**

- **Selectors 4 and 5: No. of CNG cycles to be detected (For the FAX725M/590DT/590MC/825MC/875MC)**

  The equipment interprets CNG as an effective signal if it detects CNG signal by the number of cycles specified by these selectors in any of the following cases:

  - when the line is connected via the external telephone in the external TAD mode.
  - when the line is connected via the facsimile equipment in F/T or TAD mode.

- **Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the equipment receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

  If these selectors are set to “1, 1”, the CNG detection will not be inhibited.

[B] Printout of firmware switch data

■ Function

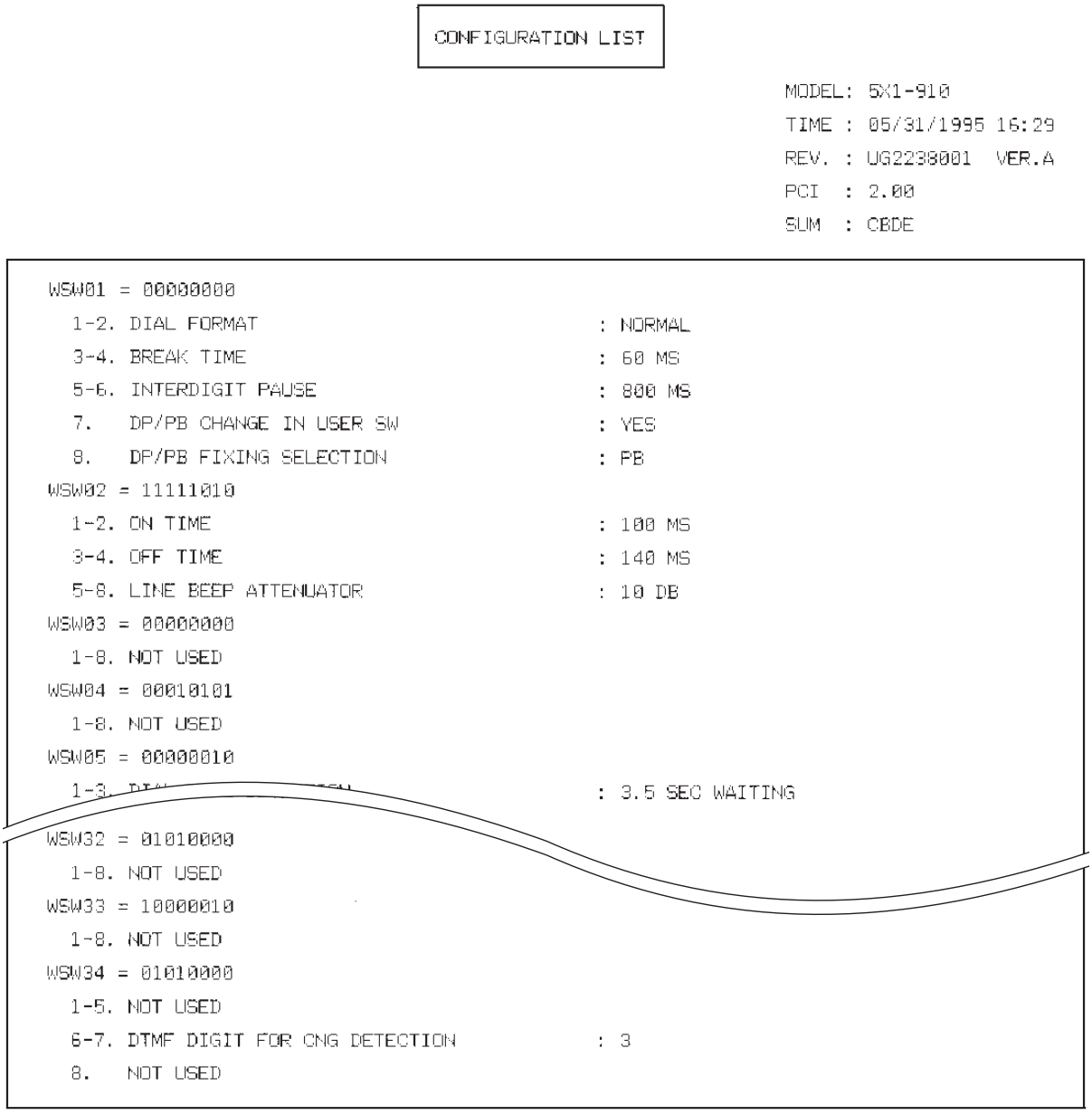
The equipment prints out the setting items and contents specified by the firmware switches.

■ Operating Procedure

(1) Press the [1] key twice in the initial maintenance mode.
The "CONFIG LIST" will appear on the LCD.

(2) The equipment prints out the configuration list as shown in the figure below.

(3) Upon completion of printing, the equipment returns to the initial maintenance mode.



```
CONFIGURATION LIST

                                        MODEL: 5X1-910
                                        TIME : 05/31/1995 16:29
                                        REV. : UG2238001  VER.A
                                        PCI  : 2.00
                                        SUM  : CBDE

WSW01 = 00000000
  1-2. DIAL FORMAT                      : NORMAL
  3-4. BREAK TIME                       : 60 MS
  5-6. INTERDIGIT PAUSE                 : 800 MS
  7.   DP/PB CHANGE IN USER SW          : YES
  8.   DP/PB FIXING SELECTION           : PB
WSW02 = 11111010
  1-2. ON TIME                          : 100 MS
  3-4. OFF TIME                         : 140 MS
  5-8. LINE BEEP ATTENUATOR             : 10 DB
WSW03 = 00000000
  1-8. NOT USED
WSW04 = 00010101
  1-8. NOT USED
WSW05 = 00000010
  1-3. DIAL TONE DETECTION              : 3.5 SEC WAITING
WSW32 = 01010000
  1-8. NOT USED
WSW33 = 10000010
  1-8. NOT USED
WSW34 = 01010000
  1-5. NOT USED
  6-7. DTMF DIGIT FOR CNG DETECTION     : 3
  8.   NOT USED
```

Configuration List

3.3.6 Operational check of control panel PCB

■ Function

This function checks the control panel PCB for normal operation. Two types of check modes are available: Key & button operation check mode and LED operation check mode.

■ Operating Procedure

[a] Key & button operation check mode

(1) Press the [1] and [3] keys in this order in the initial maintenance mode.

The "00 " will appear on the LCD.

(2) Press the keys and buttons in the order designated in the illustration shown below.

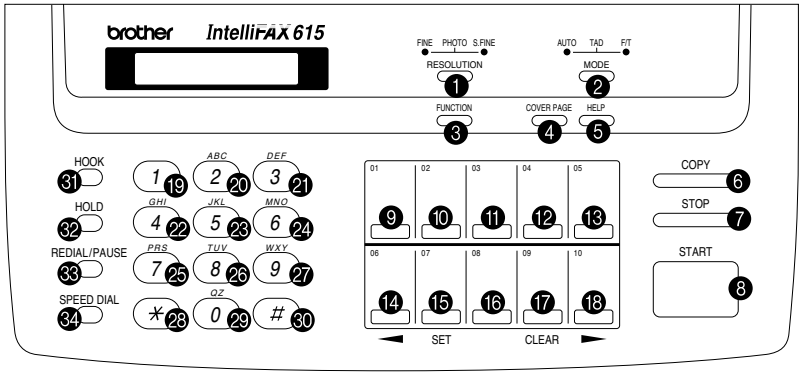
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.

If a key or button is pressed out of order, the equipment beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the [STOP] button.

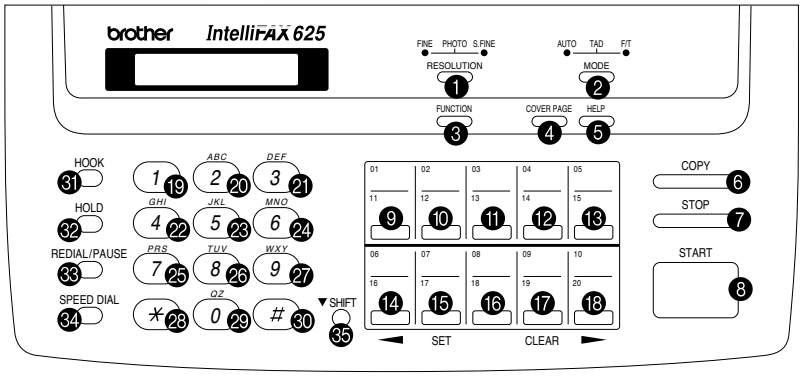
(3) After the last number key or button is pressed, the equipment beeps for 1 second.

(4) To terminate this operation, press the [STOP] button. The equipment returns to the initial maintenance mode.

FAX570/615

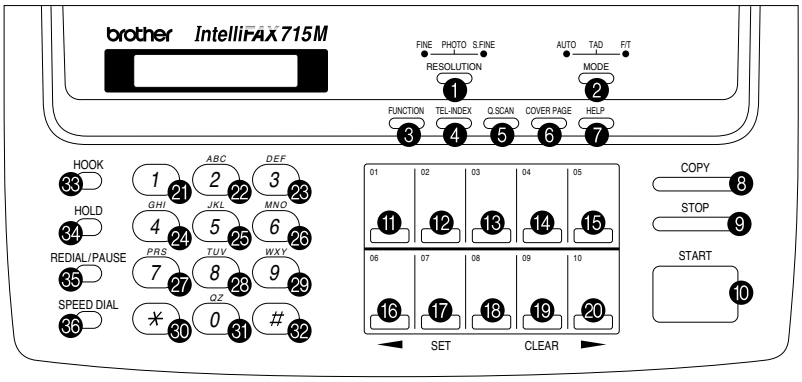


FAX100/625/635/675

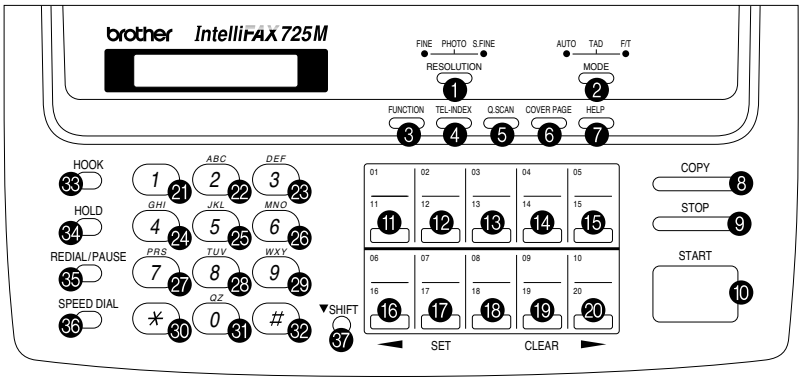


Key & Button Entry Order (1)

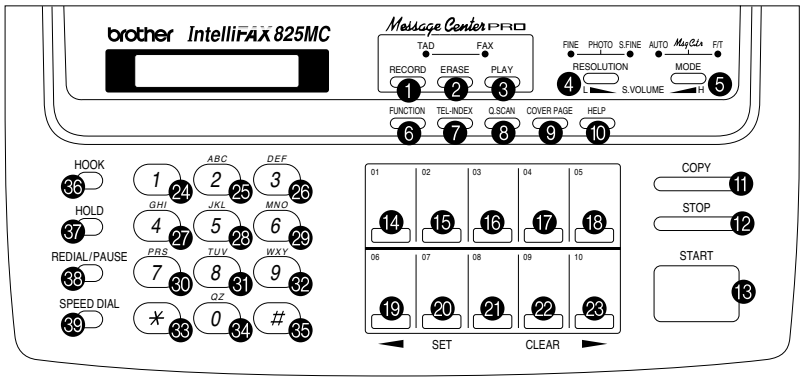
FAX575M/715M



FAX725M

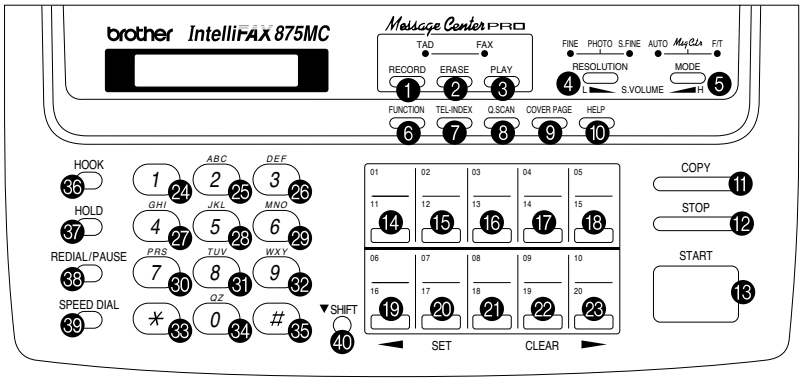


FAX590DT/590MC/825MC



Key & Button Entry Order (2)

FAX875MC



Key & Button Entry Order (3)

[b] LED operation check mode

(1) Press the 1 and 6 keys in this order in the initial maintenance mode.

All of the LEDs will come on and go off, then each LED will light for 0.5 second in the following order:

FINE → S.FINE → AUTO → F/T

(2) To terminate this operation, press the STOP button. The equipment returns to the initial maintenance mode.

3.3.7 Sensor operational check

■ **Function**

This function allows you to check that the six sensors (document front sensor, document rear sensor, cover sensor, PE sensor, cutter sensor and hook switch sensor) operate correctly.

The LCD shows the "FRE RC PE CH HK" when

- the document front and rear sensors detect no paper (FRE),
- the recording paper cover is closed (RC),
- the PE sensor detects paper loaded (PE),
- the cutter sensor detects that the cutter is placed in the home position (CH), and
- the hook switch sensor detects the on-hook state (HK).

■ **Operating Procedure**

(1) Press the [3] and [2] keys in this order in the initial maintenance mode.

The LCD should show "FRE RC PE CH HK" if the detecting conditions of the six sensors are as defined above.

(2) Change the detecting conditions (e.g. insert paper through the document sensors, open the recording paper cover, remove the recording paper, shift the upper blade of the automatic cutter out of its home position, and lift up the handset), and then check that the indication on the LCD changes according to the sensor states.

(3) To stop this operation and return the equipment to the initial maintenance mode, press the [STOP] button.

3.3.8 CCD scanner area setting

■ **Function**

The equipment sets the CCD scanner area and stores it into the E^2PROM.

■ **Operating Procedure**

(1) Press the [5] key twice in the initial maintenance mode.

The "SCANNER AREA SET" will appear on the LCD.

The equipment checks and sets the area to be scanned.

If no error is noted, the equipment returns to the initial maintenance mode.

If any error is noted, the "SCANNER ERROR" will appear on the LCD. To return the equipment to the initial maintenance mode, press the [STOP] button.

3.3.9 Equipment error code indication

■ **Function**

This function displays an error code of the last error on the LCD.

■ **Operating Procedure**

(1) Press the [8] and [2] keys in this order in the initial maintenance mode.
The LCD shows "MACHINE ERROR xx."

(2) To stop this operation and return the equipment to the initial maintenance mode, press the [STOP] button.

FAX100/570/615/625/635/675/575M/715M
FAX725M/590DT/590MC/825MC/875MC

APPENDICES

Circuit Diagrams

A. Main PCB
   FAX100/570/615/625/635/675/575M/715M
   FAX725M/590DT/590MC/825MC/875MC
B. Network Control Unit (NCU) PCB
C. Control Panel PCB
D. Power Supply PCB